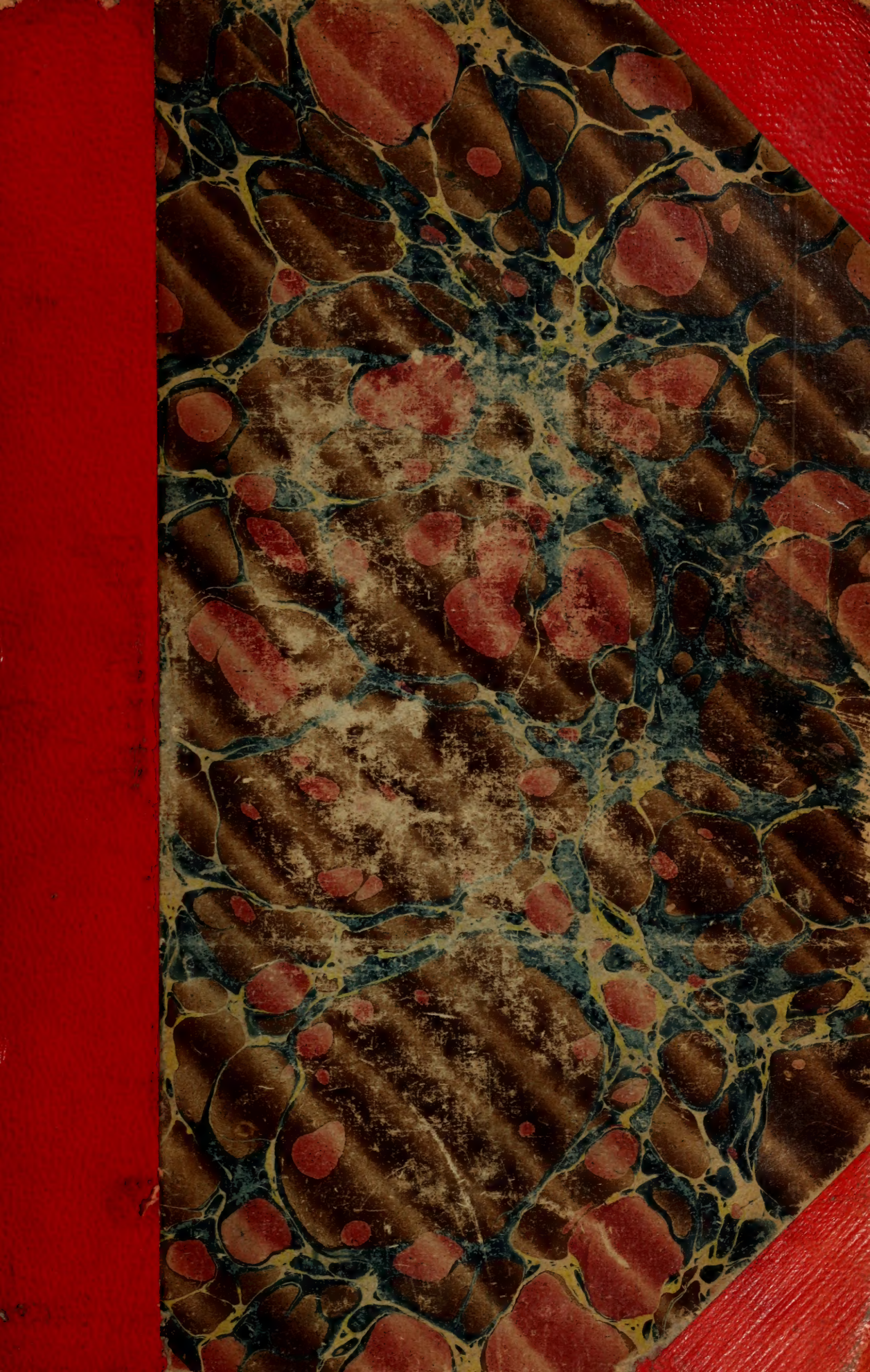


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THE MONTHLY REVIEW
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THE LONDON DENTAL SCHOOL.

The progress which has been made, so far, by the London School of Dental Surgery must be gratifying to every member of the profession. The School now, to say the least, will bear favourable comparison with any similar institution in other countries, whether as regards its means of imparting instruction, or the number of students attending its classes. It is our desire, however, to see this institution not merely on a par with others, but rather taking the lead in every movement of advance—in every direction tending to the elevation of the profession. To achieve this position, the performance of scientific work is of the first importance, and it is in this direction that the School has accomplished little or nothing of any value. In this matter, the best example is afforded by the medical schools, which vie with each other in scientific experiments and research, and which are in truth obliged to do this by force of competition. Any medical school which showed itself backward in adopting the latest improvements, in investigating new theories of science, and in experimenting with novel discoveries, would be soon deserted by students for other establishments of better reputation. The wholesome stimulus of competition has not been brought to bear upon the London Dental School, nevertheless any deficiency must be noticed by the students, as well as by the profession in this country and abroad. The responsibility which thus rests upon the hospital staff is exceptionally great; they, and almost they

only, have the opportunity of testing at once, by careful experiments and statistics, the value of new theories and new appliances, and if they neglect this opportunity, not only the School, but the whole profession must suffer. It may be said, perhaps, that some of the work which we have indicated is really carried on by the School, but, if it be, we ask, why have the results never been published? The work might have been as well left undone so far as it has benefited the profession. With the facilities for recording and comparing cases and for experiments which exist at the hospital, no novelty worthy of notice ought to remain a day without systematic testing. It would, however, be easy to enumerate a score of new theories and of appliances and remedies (introduced within late years) several of which have been accepted as valuable additions to our knowledge and practical resources, and yet in the labour which has brought about these advances, the London School of Dental Surgery can be credited with but little. If the School were made pre-eminent as the head quarters of scientific progress and as a model for all other dental educational institutions, it would be impossible to over-estimate the benefit which would accrue to the whole profession in this country. A body of dentists educated at a school acknowledged to be the first in the world, would be elevated surely and speedily in the estimation of their brethren and the public.

The appointment of a Registrar, with functions similar to those performed by such officers at other hospitals would, at least, insure the utilisation of recorded cases, it being his duty to classify these and arrange them for publication. Such materials would, doubtless, be acceptable to the Odontological Society, which is not always so fortunate, as during the present session, in having too much matter for discussion at its meetings. It must in fairness be men-

tioned that one member of the hospital staff—the newly elected Dean—in offering a prize to the student who shall prepare the best report of a series of cases of exposed pulp, has most practically demonstrated the importance which he attaches to systematic case-taking; and it is to be hoped that the hint and example conveyed by this act may not be vainly afforded.

We are aware that much hard work has been accomplished, by the staff of the Dental School, and we give them credit for all they have done, and acknowledge that they have had many difficulties to contend with. Now, however, their real troubles are at an end, the School is well established in every respect, and it must be ever remembered that movement and progress are required if only to prevent decay, whilst active, well-organized work must be carried on if the Institution is to achieve the position which is desired for it, and if it is to confer upon the profession of this country the benefits which may be fairly demanded from it, and which it is evidently capable of bestowing.

We learn from a letter to our contemporary, the *British Journal of Dental Science*, that it is proposed to establish a fund with a view to having a bust of Mr. Edwin Saunders executed and placed in the Dental Hospital, Leicester Square. Mr. Saunders has done so much to merit the esteem of the profession, that we should extremely regret if the scheme met with anything but the success which it deserves. It is customary, in promoting a step in which a large number take an interest, to endeavour to obtain, in the first instance, an executive committee of representative men. This formality has apparently been omitted in the present instance, for we are favoured with no names save those of the projector of the scheme and the treasurer of the funds to be received.

ON THE

MICROSCOPICAL STRUCTURE OF FOSSIL TEETH,

FROM THE NORTHUMBERLAND TRUE COAL MEASURES.

By W. J. BARKAS, M.R.C.S.E., L.R.C.P., London.

[*Continued from p.* 539.]

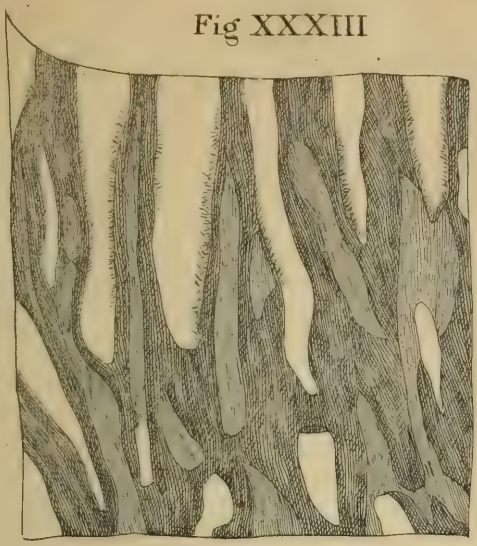
PETALODOPSIS (*continued*).

Petalodopsis mirabilis presents two extraordinary features in its minute structure, firstly in the arrangement of the vascular canals in the base of the tooth and in the crown, secondly in the mode of branching observed in the calcigerous tubules ramifying in the hard tissue of the crown.

In the base the vascular canals are very numerous, and run apparently at right angles to the vertical axis of the tooth, those near the inferior border are larger than those near the junction of the base with the crown, the decrease in size being gradual, the variation in diameter being from one one-hundredth of an inch to one six-hundredth; the canals at the inferior border are patent, and at the superior border are continous with those of the crown, those that extend to the external surfaces remain open, not being closed in by dentine or ganoine. Branching occurs freely, the branches being given off apparently at all angles, a vertical section of the base has, therefore, somewhat of a reticulated appearance (Fig. XXXV.); the tissue between the vascular canals is homogeneous and is not arranged around them in concentric layers; the proportion of tissue to the sum of the diameters of the canals is nearly equal, that is, the tissue situated between two canals is on an average about equal to the diameter of one of the canals. From all the vascular canals spring numerous calcigerous tubules which branch and inosculate very freely, the branches arising from the same trunk anastomosing with each other and with the branches from neighbouring systems besides this frequent anastomosis the branches are freely interlaced one with the other, so that it is difficult to examine their arrangement, and it renders the tissue of the interspaces dark and cloudy; the course of those that can be examined satisfactorily is observed to be short and wavy. The average diameter of the tubules at their origins is about one six-thousandth of an inch.

In the crown the canals are still very numerous, and

Fig XXXIII



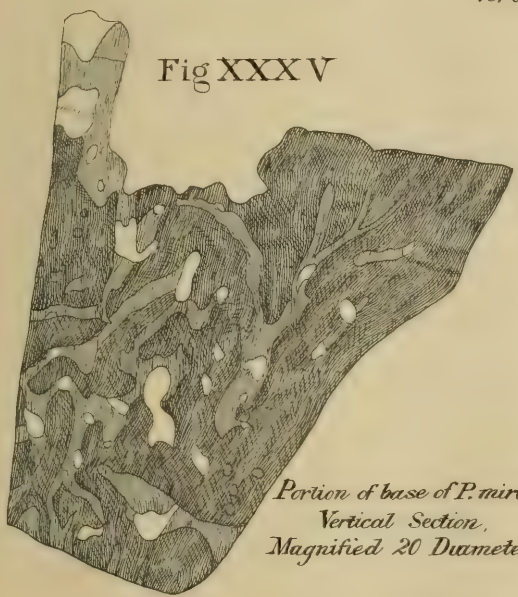
Vertical Section of Crown of Petalodopsis mirabilis.
Magnified 80 Diameters.

Fig XXXIV



Vertical Section of Crown of Petalodopsis mirabilis.
Magnified 200 Diameters.

Fig XXXV



Portion of base of P. mirabilis.
Vertical Section.
Magnified 20 Diameters.

Fig XXXVI



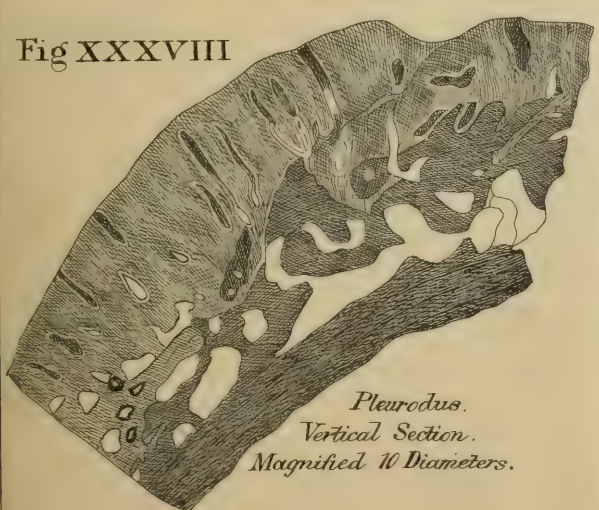
Jaw of Pleurodus.
Nat. Size.

Fig XXXVII



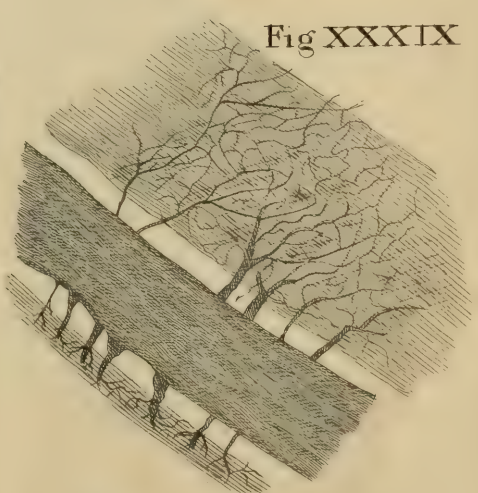
Superior Surface of
Pleurodus Tooth.
Nat. Size.

Fig XXXVIII



Pleurodus.
Vertical Section.
Magnified 10 Diameters.

Fig XXXIX



Vertical Section of Pleurodus.
Magnified 200 Diameters.

T. Bessent, lith, 29 Essex St., Strand.

though they are continuous with those in the base, they have undergone certain marked changes in their course, &c., the change occurring at the junction of the base with the crown; their course is now directly parallel to the vertical axis of the tooth, and they are almost parallel to each other; branching still occurs but not so frequently as in the base, and the branches are given off at an acute angle. This arrangement of the canals gives the crown the appearance of being composed of a series of upright tubes (Fig. XXXIII.) when a vertical section is examined under a low power. The canals are smaller in diameter than those in the base, and also more uniform in size throughout their course, the average diameter being one three-hundredth of an inch; they are open on all the external surfaces, thus giving rise to the pitted appearance observed thereon. The tissue between the canals is homogeneous and not laminated, and they are in about equal proportions. From all the canals arise calcigerous tubules, which are short and run a straight course, they branch frequently, and the terminal branches anastomose with those from the nearest vascular canals, the intermediate branches inosculate with others given off by the same trunk or with those arising from neighbouring tubules but which spring from the same canal, they measure at their origin about one eight-thousandth of an inch in diameter, and the minute branches average about one thirty-thousandth of an inch, but the extreme terminal branches can only be observed under a power of 600 diameters, they have therefore an exceedingly small, almost immeasureable, diameter. Fig. XXXIV. gives an excellent illustration of the method of branching pursued by these tubules, and it will be observed that this arrangement is totally different from that of any tooth-structure that I have yet figured, and I can further add that it differs from the mode of branching in other teeth, whether fossil or otherwise, the structures of which I have investigated under the microscope. The tubules arise by a comparatively large trunk which immediately gives off from all sides a number of short fine tubules, some of which are larger and longer than the others, these larger branches in their turn give off minute branches in the same manner as the parent stem; the trunk of the tubule after proceeding a short distance divides into two main branches which

give off two sets of tubules like the main portion of the tubule; this process of double division goes on till anastomosis takes place with the terminal branches of a tubule from a neighbouring canal. Each tubule and its main branches divide dichotomously. Although the figure I have exhibited shews the peculiar structure very fairly, it requires at least 600 diameters to do so perfectly, and even under that high power it requires a trained eye to detect the minute branches dividing once again. I cannot better express in words the peculiar method of branching of the tubules and the main branches than by remarking that they are "feathered."

PLEURODUS *(Ag.)*

The Cestraciont teeth I have described so far, viz., Petalodus, Petalodopsis, and Ctenoptychius, are usually grouped together under the name of Petalodonts, but the series which includes Pleurodus, Helodus, and Pœcilodus is named Psammodont, from some of their principal characteristics resembling those of Psammodus, a tooth from the Carboniferous Limestone, more especially in the porous or pitted aspect of the external surface of the crown, in the somewhat compressed shape of the tooth from above downwards, the flattened masticating surface, &c.

Single teeth of Pleurodus are found with comparative frequency in these measures, and are also to be obtained from the Coal Measures of other districts and from the Mountain Limestone (subcarboniferous); they have been discovered lately in an altogether new horizon, in a seam of coal called the Townley Seam, situated thirty-eight fathoms below the Low Main Coal Seam, and which is worked at the village of Ryton, in the county of Durham. The fish to which these teeth belonged was undoubtedly a Selachian, but for a long period it was only known by these single specimens; Messrs. Hancock and Atthey, however, were fortunate enough to find a nearly perfect fish from the Coal Measures of Newsham, in Northumberland (it is from this pit that I have obtained most of my specimens). This discovery conclusively settled any doubt there might be as to Pleurodus being a Cestraciont, and also proved that the teeth were truly teeth and not dermal tubercles. The jaws were, however, shewn in a very indistinct manner, so that it was impossible to ascertain

their exact shape or the method of arrangement of the teeth upon them. A description of this fossil fish appeared in the fourth volume of "The Transactions of the Northumberland and Durham Natural History Society," accompanied by an excellent engraving. In that paper the authors tried to point out certain resemblances between this fish and the genus Wodnika of Munster, but as to their belonging to the same genus, I am not in a position to give an opinion, for I have never seen the specimens, and it is difficult to judge from descriptions and engravings of imperfect fishes. Munster's description of Wodnika will be found in his work entitled "Beiträge zur Petrefacten-kunde." The single teeth have been very imperfectly described, Messrs. Hancock and Atthey being the only authors I am acquainted with who refer to them with any detail. Agassiz merely names the different species; and in Part III. of the paper on the "Iron Ores of Great Britain," which appeared in the "Memoirs of the Geological Survey of the United Kingdom," are drawings of two varieties, viz., P. affinis and Pœcilodus (?) the latter being really Pleurodus, but no description accompanies them. About the end of last March, I was exceedingly gratified to alight upon a jaw (probably upper) of this fish, with the teeth in situ, the whole being in a perfect state of preservation; and in the beginning of the following month I discovered another in the collection of Mr. Simm, of Cramlington. The latter jaw, however, is partially buried in shale, and the teeth have been slightly displaced though all are there, at least there are as many as are to be observed on my perfect jaw. These jaws are somewhat of the shape of a horse-shoe, with the central portion of the curve prolonged forwards, so as to form a blunt rounded extremity; the anterior portion is therefore wider than either of the articular ends (Fig. XXXVI.), the width at the latter point is one-fifth of an inch, and at the former two-fifths of an inch. The superior surface is the only part of my specimen that has been cleared from shale; it is slightly convex from side to side and has situated upon it five teeth, there being one tooth on each arm and three on the broad anterior portion of the jaw, which is, however, not wholly covered by these teeth, for they are placed upon the posterior portion of that surface only, the anterior portion being covered with irregular tuberculations. It will

be observed that the teeth present two forms, and are arranged upon the jaw with the lateral prolongations pointing antero-posteriorly. These jaws then, so far as I am aware, are the first that have been discovered intact, and about which there can be no dispute; they present a very curious feature in the small number of teeth situated upon them, but they are undoubtedly sufficient for all practical purposes, for the fish is a comparatively small one, the three anterior teeth with the sharp keel running along their superior surface would be competent to hold or lacerate minute living prey if occasion required, and the two flattened posterior teeth would present a large enough surface to crush minute crustacea, &c., this being, probably, the food they principally lived upon.

On the day I received the proof of this paper, I had the good fortune to be able to make a vertical section of a portion of a jaw of Pleurodus with two teeth of P. Rankinii in situ. The substance of the jaw when examined under the microscope, I found to possess neither Caminæ, Cacunœ, nor Canaliculi, characters always present in true bone, but the tissue is permeated by comparatively large freely branching canals which are continuous with the vascular canals of the teeth; the tissue itself is homogeneous, and apparently structureless. The basis of the jaw is therefore undoubtedly cartilaginous, and resembles closely some sections of fossil fish cartilage I had made some time previously. We are now certain that Pleurodus had a cartilaginous endo-skeleton like all Selachians.

Only two varieties of these teeth have been named—P. affinis (Ag.) and P. Rankinii (Ag.) I am acquainted with five variations of form, but it is not probable that these are teeth of distinct species, seeing that two of the different forms are found upon the jaw I have just described, viz., P. Rankinii and the so-called Pœcilodus (?) figured in the "Iron Ores of Great Britain."

The first variety I shall refer to is the tooth shewn in Fig. XXXVII., this being apparently the typical form. The tooth is oval in shape, and varies in size from two-fifths of an inch to one-half an inch in length, and the breadth also increases in proportion to the length; it is concavo-convex, and the sides of the tooth near the centre are expanded outwards, one side being always more pro-

longed than the other. The superior surface is convex in all directions, is smooth and slightly glistening and is covered with minute pits. The inferior surface is concave and smooth within the concavity, but the margin surrounding the depression is irregularly tuberculated. The lateral prolongations are ridged on the superior surface only; the ridges are broad and run from the body of the tooth directly to the periphery, one ridge being parallel to the other; the surface is smooth and pitted like the superior surface of the body of the tooth. This is the variety named Pleurodus affinis in the "Iron Ores of Great Britain," and figured in Plate 1, figs. XVIII. and XIX.

The second variety differs from the above in having the lateral prolongations tuberculated and not ridged, but in every other respect they are similar. This is the tooth named Pœcilodus (?) that I have already referred to, and which is exhibited in Plate 1, fig. XX. of that paper; but it will be noticed that it is this variety that is found on the projecting rami of the jaw I have figured and associated thereon with undoubted teeth of Pleurodus Rankinii.

The third form is Pleurodus Rankinii, three of which are situated on the anterior portion of the jaw, Fig. XXXVI.; it is the smallest of all the varieties, and also the most common; it differs from the others in being strongly carinated along the superior surface, the carina running along the long axis of the tooth; this ridge is generally situated nearer one side than the other, and closer to that side which has the smaller lateral prolongation. The superior surface is smooth and pitted, the inferior is concave, and the lateral prolongations are ridged as in the first variety. The lateral extremities of the tooth are pointed, and the body of the tooth is longer in proportion to the breadth than in the other cases. It is this tooth that Messrs. Hancock and Atthey described as belonging to the nearly perfect fish they discovered.

The fourth form resembles the first, except that it is generally larger, and that the superior surface is grooved antero-posteriorly, that is from one lateral prolongation to the other; the grooves vary in number from one to three, and are commonly situated near one extremity, the other being smooth; this, I believe, is the only form of Pleurodus found in the subcarboniferous limestone.

The fifth can hardly be considered a variety at all, for it

is similar to the above, with the exception that the lateral prolongation is tuberculated, not ridged.

The variation of form in the teeth of Pleurodus from the Coal Measures is, we have seen, very slight, and in their microscopical structure they do not differ at all, so that it will only be necessary for me to describe the structure of one variety, and as P. affinis is the most typical tooth, I shall select it for description.

Each tooth consists of three layers of dentine and one of ganoine (Fig. XXXVIII.), one immediately overlying the other and arranged at right angles to the vertical axis; in the small teeth of P. Rankinii these layers are not as distinctly separated as in the larger varieties, but they are all present. The lowest layer forms what may be called the base of the tooth, and is composed of thin laminæ of dark and dense unvascular dentine placed concentrically one above the other and parallel to the superficies; I have never been able to detect calcigerous tubules ramifying in its substance. The intermediate layer is formed of vascular dentine, the medullary canals being very large and measuring on an average one-hundredth of an inch, they branch freely, the branches run in all directions, and anastomose with the surrounding canals, their diameters are almost as large as the canals from which they spring; on account of the large branches and their free anastomoses, it is almost impossible to define the course pursued by the main canals.; from all the canals spring calcigerous tubules which ramify in the tissue surrounding the canals, this tissue is homogeneous and not laminated, the quantity of tissue between the canals is equal to about two-thirds of their diameter. The upper layer is also composed of vascular dentine, but the dentinal tissue preponderates over the canals which gives this layer a much denser appearance than the intermediate, though not so dense as the lowest; it is permeated by vascular canals, but they are comparatively few in number and are continuous with those in the intermediate layer, they are much smaller, the average diameter being about one-five-hundredth of an inch; they run perpendicularly to the superficies and parallel to each other, they do not branch, but pursue their course uninterruptedly to the periphery, sometimes terminating within a short distance of the external surface where they are closed in by the dentinal tissue, but

generally they are open, and are closed in by the layer of ganoine which covers the whole of the superior surface. The tissue between the canals is unlaminated, but those portions of it immediately surrounding the canals are clear and homogeneous, while the intermediate portions, under a power of 10 diameters, appear dark and cloudy, but a higher power of 200 diameters exhibits these dark portions filled with the ramifications of the calcigerous tubules which are freely given off by the canals. The layer of ganoine extends over the whole of the superior surface; it is one seven-hundredth of an inch in thickness; I cannot detect any tubular arrangement in it, though I have examined it under a power of 600 diameters. Calcigerous tubules ramify in the dentinal tissue of the intermediate and upper layers, they are very numerous and divide and subdivide very frequently, the branches interlacing to a great extent with each other and with those from neighbouring tubules; they also anastomose very freely, and in a vertical section appear to form a continuous network (Fig. XXXIX.) between the canals; but in a transverse section, besides this network, there are other branches running through or interlacing with it. The appearance seen in Fig. XXXIX. is best observed in the upper layer, for in the intermediate one the tubules and branches are very large, more numerous and inextricably interlaced. The latter tubules average one two-thousandth of an inch in diameter, at their origin, while in the upper layer they measure about one three-thousandth, and their finest branches about one seventeen-thousandth of an inch.

I have not thought it necessary to figure a transverse section of this tooth, because when I come to speak of the tooth of Pœcilodus I shall exhibit its transverse section which has exactly a similar appearance when examined under a power of 20 diameters, but under a power of 200 diameters there is no resemblance between those sections, Pleurodus then presenting characters similar to Fig. XXXIX.

ON THE

EXISTENCE OF AN ENAMEL ORGAN IN AN ARMADILLO (Tatusia Peba).*

* The substance of this paper was communicated to the Physiological section of the British Association at Bradford (1873), and was subsequently published in the *Quarterly Journal of Microscopical Science*, for January, 1874. It has been in part re-written for this Journal.

By CHARLES S. TOMES, M.A.

The study of development, in itself of engrossing interest, has received of late years a great impetus from the writings of Von Baer, Darwin, Huxley, and many others, who have done much to teach us the great truths which underlie the whole system of nature, so as to connect in one coherent scheme the infinite number of isolated observations of which the significance had long escaped notice. Thus in the study of development we are constantly meeting with structures, which, being transient, disappear or become masked in the adult form, but which are clues to the affinities, or in other words, to the remote parentage, of the creature under investigation.

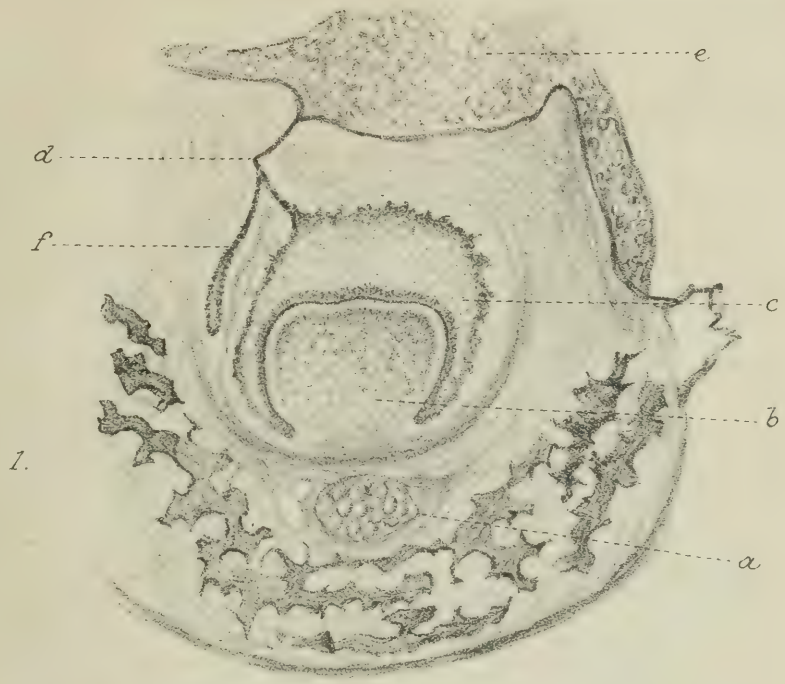
In the matter of tooth development there is a great and almost untouched field for research of this kind, for, unfortunately, most imperfect and inaccurate descriptions of it are to be found in recent and otherwise excellent text books, heedlessly copied from one work to another without the authors having taken the trouble to verify them; hence it happens that, taking into consideration the small number of works accessible to english students in which anything like correct views are given, it is almost indispensable to preface the description of the matter sepcial to the armadillo by a slight sketch of the condition met with in other animals.

According to the views of Arnold and Goodsir, which have passed current for so many years, the dental germs first made their appearance as free, uncovered papillæ, rising up from the bottom of an open groove, to which was applied the name of "primitive dental groove;" but this view is now in important particulars obsolete.

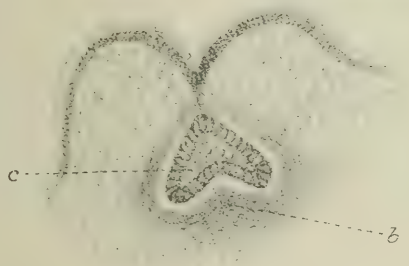
As expressing the old views on this matter concisely, I may quote the words of Professor Owen:—

"In the development of a tooth, a matrix or formative organ, corresponding in complexity with the kind of tooth

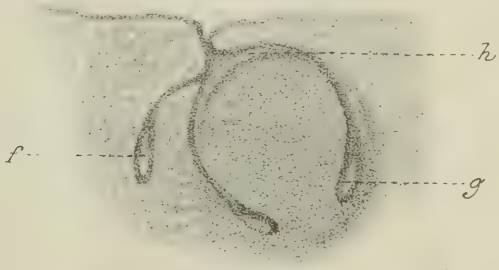
From the quarterly Journal of Microscopical Science.



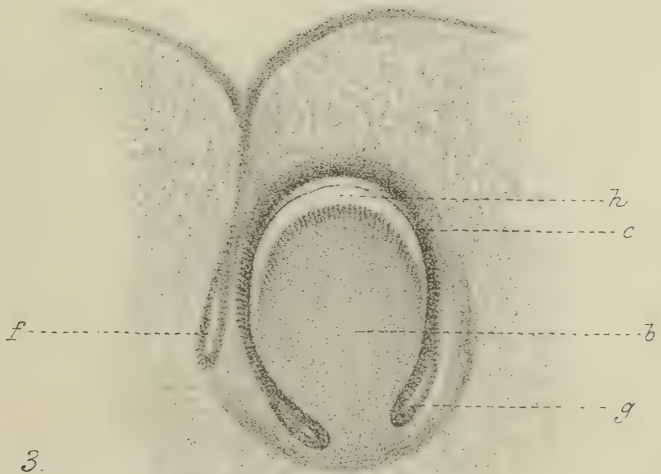
1.



2.



4.



3.

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to be formed, is first developed. It consists either of a soft vascular papillæ—*a free conical process*—as in certain fishes, which mould of the future simple tooth is called its 'pulp,' or 'the dentinal pulp,' or it consists of the pulp enclosed in a capsule, or *of a pulp with such a modification of its peripheral part*, situated between the pulp proper and its capsule as to merit a distinct definition as an 'enamel organ.' The *first* and *most constant* of these parts is termed the *dentinal pulp*, the *second* is the *capsule* or cemental pulp, and the *third* is the '*enamel pulp.*'"

The data from which these generalisations were drawn having been since found to be in some essential respects inaccurate, they require modification; but for our present purpose it will suffice to accept them as fairly representative of the views at present held by a large majority of anatomists.

It can hardly be disputed that, in their completed condition, the simplest teeth consist of a single substance, viz., dentine, and that the addition of cementum constitutes an advance in conplexity, while the presence of a third substance, enamel, marks a third stage in complexity. Fragmentary as is our knowledge of the laws of development, if there is one thing more clearly indicated than another, it is that the more general the structure, the earlier it makes it appearance. In other words there is a progress from "the general to the special" in development; starting from the ovum which (unless from some character which may fairly be called accidental, such as pigmentation, &c.) gives no clue as to whether it belongs to a vertebrate or invertebrate, we can gradually exclude the larger groups, then the smaller, and so on till we can identify the sex and the species.

Thus we can first say that it is vertebrate or invertebrate, then that is fish, reptile, bird or mammal, and so on, the most general character being determinable first, the most special last.

Applying our data to tooth development the inference is clear; if dentine be the most general or fundamental structure, then the dentine germs ought to appear first, next the cement germs, last of all its enamel germs, and an animal which has no enamel on its teeth might fairly be expected to have no enamel germs.

But here at once we are brought face to face with a

difficulty, insoluble until the tooth development of all tooth-bearing classes of animals has been satisfactorily examined. Kölliker first showed that in Ruminants the various germs do not appear in the order above indicated, and Waldeyer and Emil Dürsy have confirmed and extended his observations in man and some other mammals. They have shown that (1) there is never at any time a deep, widely open groove, from the bottom of which spring up free uncovered papillæ, but that the "primitive dental groove" as seen and described by Arnold and Goodsir was "artefact;" and (2) that at a period when the dentine germ has no definite histological characters, but is only distinguishable from the surrounding tissue as a slight opacity of no very definite form nor definite limits, its enamel germ has undergone an active growth and very manifest histological differentiation of its component cells (see fig. 2.)

Thus although a skilled observer can detect faint indications of the future dentine germ, the first thing of which he can be positive is the enamel germ, which at this early period is far in advance of the other component parts of the tooth in respect of its development. In thinking over the increased importance from a homological point of view, which is given to the enamel organ by its very early appearance and its entire independence of the dentine germ in its origin, it occurred to me that it would be exceedingly interesting and instructive, to examine the tooth germ of a mammal whose teeth are not coated with enamel; and I hasten to acknowledge the kindness of Professor Agassiz in America, of Professors Rolleston and Westwood at Oxford, and of Professor Flower at the Royal College of Surgeons, for placing all the material which they possessed at my disposal.

The difficulty of the inquiry was very greatly enhanced by the condition of the specimens, which had all been kept in methylated spirit of varying strength, and it was extremely troublesome to make sufficiently thin sections, because the tissues were very friable. The best results were obtained by placing them in absolute alcohol, whence they were transferred to strong glycerine, and then imbedded and cut in the usual way.

In order to make my description more intelligible I have placed side by side with the figures of the dental germs of the armadillos a drawing of a section through the lower jaw of a calf (fig. 1), to some few points in which I will draw attention before comparing and contrasting them with one another.

The enamel organ (*c*) in this figure forms a cap, embracing the upper part and sides of the dentine germ (*b*); it is seen to be still connected with the epithelium (deep layer) of the mouth by a thin dark line, which, under favorable conditions of lighting, &c., may be seen to consist of a double row of cells. Where this merges into the enamel organ these two rows of cells separate and pass round the periphery of the enamel organ, forming what is known as the "external epithelium of the enamel organ;" near to the base of the dentine germ this layer of epithelium is reflected upon it, and forms a complete investment to its surface, in which situation it is termed the "internal epithelium of the enamel organ."

But in the calf these external and internal epithelia are widely separated and form but a small proportion of the whole bulk of the enamel organ, the intermediate space being occupied during the formation of the enamel by a stellate reticulum, which seen by the naked eye looks almost semi-fluid or gelatinous. When the deposition of enamel is completed, this gelatinous mass disappears and the external comes into contact with the internal epithelium; a fact of some interest in connection with its structure in the armadillo.

From the line of cells which connect the enamel organ with the deep layer of the oral epithelium (by an inflection of which it was originally formed) runs downward a process consisting of a double row of cells, not unlike a simple tubular gland; this has been shown by Professor Kölliker to be the enamel germ of the permanent tooth.

The earliest condition of dental germ which I have observed in the armadillo is represented in fig. 2; the section was taken from a fœtus about an inch long. At *c* is seen the enamel germ, consisting of a mass of cells, those upon its surface being distinctly differentiated from those in its interior, and forming a sort of epithelial investment to it; it is connected with the epithelium of the oral cavity by the usual thin neck of cells, and it is similar to, and

in fact perfectly indistinguishable from, the enamel germs of those other mammals which do have enamel upon their perfected teeth.

The future dentine germ and its processes forming the capsule are as yet only represented by a slight opacity, which has been rather exaggerated in the drawing.

The next stage which I have observed is represented in figs. 3 and 4; the dentine papilla (*b*) has taken a definite form; the cells on its exterior have become differentiated to form an odontoblast layer, and towards the top of a thin cap of dentine (*h*) has already been formed.

Closely applied to the formed dentine, and extending below it on the surface of the dentine germ, is an investment of columnar cells, exactly like the internal epithelium of the enamel organ (enamel cells) of other mammals, and at first sight this might appear to be all that there is. But in specimens which have been slightly displaced or torn, the epithelium is seen to really consist of two layers, one of which adheres closely to the dentine, and the other to the capsule; and towards the base of the dental germ, where the epithelial layer is reflected over it, it can always be seen to be double (see *g*, figs. 3 and 4). In fact this apparently single layer is really made up of the internal and external epithelia in close contact with one another, owing to the absence of that reticulate tissue which separates them in the enamel organ of those animals which form enamel on their teeth. And this is just what has already been noted to be the condition of all enamel organs after the completion of the enamel. Although I have examined six or seven specimens, I have not been successful in getting satisfactory sections illustrating any other stage in the tooth development.

I have, however, examined a large number of the teeth of armadillos, removed from the tooth sacs prior to their eruption, and have not discovered the least vestige of enamel upon any of them; the cementum covers them nearly to the tip, but I have never seen it quite reach to the tip of the tooth.

The results of my inquiries may be summarised thus:

1. In *Tatusia Peba*, a creature which has no vestige of enamel upon its teeth, the first histological structure distinctly recognisable in the tooth germ is a well-developed enamel germ, perfectly identical with that seen in other mammalian fœtuses of similar age.

2. That, without any enamel having been formed, and at a very early period in tooth development (namely, contemporaneously with the formation of a very thin cap of dentine), this enamel organ assumes a condition precisely similar to that attained to by other enamel organs after their function has been completed by the deposition of the whole thickness of the enamel.

The persistent connection of the enamel with the oral epithelium from which it was derived is very well shown by many of the sections, some of which also show well the second inflection of epithelium which forms the enamel germ of the permanent tooth, thus affording an additional confirmation of the fact, to which attention has been drawn by Rapp, Gervais, and Professor Flower, that amongst armadillos *Tatusia Peba* at all events is not a monophyodont, but possesses two well-developed and functional sets of teeth.

So much for the observation; what inference can we safely draw from it?

Naturally we are led to think of the probable genealogies of the Bruta, a group of animals very remarkable in many parts of their organisation, and the first inference is that the armadillo of the present day is descended from ancestors in whom the teeth were coated with enamel, and in whom there were (as is clearly now known to be the case in *Tatusia Peba*) well-developed milk teeth.

On such a supposition the enamel organ of *T. Peba* is to be looked upon as an example of a structure which, though it has functionally disappeared, yet lingers behind as an abortive formative organ, which in the course of future ages will itself perhaps disappear and with it the last clue to the history of the dentition of the creature.

Thus in respect of its teeth the armadillo would be undergoing retrogression, and this view is sanctioned by so high authorities as my friend Mr. C. H. Garrod, and Mr. Darwin, who writes to me that he "supposes my observations will lead me to regard them as degraded forms."

At the time when my observations were made (about eighteen months ago) I myself had no hesitation in adopting the first and most obvious supposition as to this meaning, but a growing doubt made me delay their publication till I could resolve it.

However, the full resolution of my doubt is only possible when the whole subject of the development of the teeth has been traced out, and meanwhile I publish my observations for what they are worth, without committing myself to any very positive generalisations drawn from them.

The matter which rests in uncertainty may be briefly stated thus; what relation does enamel really bear to the whole tooth?

The very early appearance of the enamel germ in the course of tooth development, and the constancy of its occurrence in certain lower forms of life, upon which my observations are as yet very incomplete, unavoidably make me hesitate to regard the enamel as the third, the last, and least significant of tooth structures. Undoubtedly in its functional development it is so, but it is quite possible to be misled by the greater functional prominence of the other structures into giving to the enamel a less significance, from the point of view of homology, than really belongs to it.

Until therefore the real homology of the enamel is fully known, our judgment as to the significance of the enamel organ of the armadillo must be suspended.

THE LEGAL VALUE OF TEETH.

A curious law suit was recently tried in a New Hampshire court. A widower brought suit for damages to the amount of $5,000 against a dentist who etherized his late wife and extracted more teeth than she meant to part with. It seemed to have been a blunder on the part of the dentist, and the jury, apparently being in doubt how far a husband suffered such injury from the loss of a jaw power on the part of the wife as could be compensated in damages, brought in a nominal verdict for the plaintiff.—*Med. and Surg. Reporter.*

THE NEW LOCAL ANÆSTHETIC.

THE observation of Horwath, of Kiew, that absolute alcohol at a temperature of 20° Fahr. is a most efficient local anæsthetic, deserves to be remembered and acted upon. He finds it far superior to cold, ether, or ice, or the spray of volatile substances.—*Med. and Surg. Reporter.*

DESCRIPTION OF PLATE

Illustrating Mr. C. S. Tomes's Paper on the Development of the Teeth, in an Armadillo.

FIG.

1.—Section through the lower jaw of a fœtal calf, 6 inches long.

a. Meckel's cartilage.

b. Dentine germ.

c. Enamel organ.

d. Process connecting the enamel germ with the deep layer of the oral epithelium.

e. Epithelium heaped up over the situation of the developing tooth.

f. Enamel germ of the successional permanent tooth.

2.—From the lower jaw of a fœtal armadillo (*Tatusia Peba*) 1½ inches long.

b. Dentine germ.

c. Enamel germ.

3 and 4.—From a fœtal armadillo (*T. Peba*) 3 inches long.

b. Dentine germ.

c. Enamel germ.

f. Germ of permanent tooth.

g. Extremity of the cornua of the enamel germ.

h. Thin cap of formed dentine.

ON THE USE OF COHESIVE GOLD.

By GASCOIGNE PALMER, L.D.S.

CHELTENHAM.

In the belief that the use of cohesive gold is very little understood in this country, I hope to be of some assistance through the medium of the *Dental Review*, to those Dental Surgeons who believe, as I do, that there is no material so good in every respect for filling teeth as gold.

I intend to devote this paper to a general consideration of the subject, explaining the main principles to be observed in useing cohesive gold, and stating where cohesive gold may be used with great advantage, and where, to use it in preference to stale gold, is merely waste of time and labour.

Before proceeding further, it is as well here to define the two terms cohesive and stale, as applied to gold. Cohesive gold is gold used in such a manner as that each layer of gold shall cohere to the layer immediately preceding it, and is the same as that so often mis-called adhesive gold.

Stale gold is gold used in such a manner as that it must be tightly wedged into the cavity before it will either remain there or bear the wear and tear of mastication. Stale gold includes those kinds of gold foil called non-adhesive, neutralised and soft. But the terms are really only of consequence to distinguish the difference of the mode of working, for I believe that there is little foil manufactured that does not become considerably cohesive on being made red hot.

To those who have tried cohesive gold and have not been satisfied with the work done by them with it, and to those who reading these remarks may feel inclined to try it, I would say, divest your mind of the fact that you ever put in a stale gold plug, try and think you are going to attempt something quite new, for depend upon it, that if you attempt in cohesive gold plugging, any of those plans by which you attempt to make a stale gold plug solid, so certainly will you fail in making a perfect cohesive plug.

A perfect cohesive plug on being taken out of a tooth ought to bear being hammered flat and rolled into plate, if it will bear this there can be no doubt but that the gold is most thoroughly coherent.

There are many grades of cohesiveness to be obtained

with gold foil, and to those who being constantly in the habit of working cohesive gold become aware of the way of producing that amount of cohesiveness that they require, these various grades are of the greatest possible value. As a general rule I think I may safely state that as you increase the cohesiveness of your gold so you must decrease the quantity of gold introduced into the tooth between each condensing.

To make a perfect cohesive plug, it is also necessary that no moisture should gain access to the plug during the process of its formation. Hence a thorough knowledge of the application of the rubber dam is very desirable. All this I shall describe as we get to detail work. One of the greatest mistakes made in the use of cohesive gold, is attempting to wedge it against the sides from the centre, the effect of this is to break up your plug, and nothing in the world that I know of that can be done *in the tooth* will ever get these particles to re-unite; another great mistake is putting in a quantity of cohesive gold, and then to attempt to make it solid by pressure, either hand or mallet, on the centre of the plug, this plan is certain to make the gold leave the walls of the cavity, and it is impossible from the great solidity of the gold, to drive them back again without chipping off pieces of gold.

To make a cohesive plug, you must entirely depend on the cohesiveness of the gold, and on your retaining points or grooves; your gold must be carefully put in the retaining holes and thoroughly condensed; then layer must be added to layer, each being put as it is to remain, and each thoroughly condensed before the next layer is added, and when the last layer is added, the plug is completed; nothing else ought to require to be done, save filing, polishing, and burnishing.

Of the various kinds of gold for cohesive plugging, the best that I know of is S. S. White's Globe Foil, and although I shall speak of the use of other foils besides this for cohesive and semi cohesive plugs, I have no wish for any foil more exquisite in its working than this.

Another point that requires a little attention is the weight of the leaf. I use foil, 4, 5, 6, 8, and 12 grains to the leaf; I chiefly use 6 and 8; but I intend shortly to try some of 20 grains to the leaf, for experience teaches me to look for very excellent results from heavy foils used in single thick-

ness; but I am sure that I may endorse Mr. Ross's opinion expressed in his paper in the March number of the *British Journal of Dental Science*, that it is a great mistake always to be changing the thickness of your gold; for there is nothing more confusing than the calculation of how much gold is required for a certain space, if you are constantly varying the thickness of your foil.

Now with regard to the cylinders and pellets of gold that are being made, I can obtain no success with them, at all approaching the success I obtain with plain foil. Of course I am speaking of their use in cohesive filling; using them stale, they are very fair, but the gold they are made of is far too thin to my view.

I think I have now finished with the main principles of cohesive gold filling, and so we will pass on to the next consideration, namely, where cohesive gold may be used with great advantage.

Supposing you have either of the eight front teeth decayed in such a manner as to render it impossible for you to fill them with stale gold without exposing the pulp—

Supposing you have either of these teeth with the walls so thin as to render the introduction of stale gold wedged in fatal to them—in these use cohesive gold.

I think I may say that there is not a tooth that can be filled with amalgam, that *cannot* be filled with cohesive gold. But some teeth are so bad, and are so certainly doomed to early destruction that it would be madness to waste the time and labour on them necessary to fill with cohesive gold; here amalgam is of the greatest use.

Now with regard to where cohesive gold should not be used: it should never be used where a sound plug of stale gold can be. A thoroughly well made plug of stale gold is just as good for every purpose as a cohesive one, and it can be made in one sixth the time. Cohesive plugging is and has been for a long time a great hobby horse of mine, but it is a mistake to ride any kind of horse to death, especially so when you are certain before you start, that you have an opponent that will run you a dead heat, even if he does not beat you.

One thing more has to be considered before concluding this paper, namely, the mallet *versus* hand pressure, for cohesive plugging. To those who thoroughly understand

the peculiar properties of cohesive gold, I believe either method is good enough to ensure perfect success; the Robbin's mallet or Hele's Impactor are perhaps the quickest modes, but some teeth are so frail, and others so tender, that malleting becomes impossible.

Of the various kinds of automatic mallets, I have only mentioned Hele's, because with all the others you are unable to vary the force of your blow.

For cohesive plugging, no instruments can surpass those made by S. S. White, after the patterns of Arthur, Louis Jack, Varney, and last, though not least, Butler—whose foot pluggers are some of the most charming instruments that ever were designed.

(*To be continued next month*).

ADHESIVE FOIL.

By W. WILLIAMSON, L.D.S.
LECTURER ON DENTAL SURGERY IN THE ABERDEEN UNIVERSITY.

As I see that the question which Mr. Fletcher raised some months ago, as to the possibility of making tight plugs with adhesive gold, is still a subject of controversy, I beg to inquire in what state you found the two plugs in ivory (which I left with you when in London) after testing, and also the state of the larger shallow-approximal cavity in crown and root which I sent to you two months ago. If you have had them immersed in Mr. Fletcher's own test of red ink, till this time, I think he will allow that they have been well tested. I must say that I have never for a moment put any faith in Mr. Fletcher's statement, and using, as I do, a considerable amount of spongey and adhesive gold, I shall be very much surprised and disappointed if these stoppings have not stood the test.

I notice that Mr. Fletcher says that only five plugs, or one in seven of those sent him have stood the test, and he praises one sent by Mr. Matthew, of Edinburgh, very much. I am glad of it, but the time taken to make it (two hours), is, I think, beyond what is required to make even a large stopping *out* of the mouth, where there is perfect freedom of working, and no uneasy movements of a patient to cause delay, an absolutely tight one. Of the three stoppings in your possession, the two in ivory, though small in diameter, are deeper than any cavity of that size would be in a

tooth, and were packed in twenty-five minutes each, including the trimming and polishing of surface. One was packed with sponge, the other with Pack & Co.'s crystal gold pellets. The larger one in the tooth in thirty-five minutes, and with sponge gold.

I observe in the last number of the *Review*, a letter from Mr. G. Palmer, in which he intimates his intention to write on the whole matter of adhesive gold plugs. I have no doubt he will do ample justice to the subject, and I do not wish to forestall him; at the same time I wish to take advantage of this opportunity to make a statement, which I know to be contrary to the general opinion in regard to adhesive gold, that it cannot be wedged against the walls of a cavity quite solidly. Now, I know from experience that it can be wedged to a considerable extent without detriment to any portion of the plug, and quite sufficiently to render it as tight as a soft foil one. Those sent were so wedged, and I will stand or fall by the testing of them. Probably, if examined by a microscope, they would be found to be of irregular density, but so long as the plug is tight, some variation in the hardness, where all is hard, is, for practical purposes, of no importance. Where the walls are frail, the use of very thin flat stoppers will render an adhesive gold plug perfectly tight, without the slightest wedging force. In large cavities, by laying a firm foundation at the bottom, by anchorage or otherwise, and taking care to raise the central portion almost to the proper height, before filling in the edges with small pieces, and a thin tool, no difficulty need be experienced in making a tight plug, either with or without a slight wedging motion in packing the edges. Into the question of the comparative advantages and disadvantages of soft and adhesive foil I do not wish to enter, believing, as I do, that with either a good operator can make a perfect stopping, and that we should be eclectic in the use of materials in each case.

All the specimens sent were immersed in red ink for over two months, and when removed and broken up, were found perfectly moisture tight and sound in every way.—*Ed. M.R.D.S.*

THE

PROBABLE USE OF PLATINUM AS A FILLING MATERIAL

By THOS. FLETCHER, F.C.S.

Many attempts have been made to use platinum foil in the place of gold, but owing to the extreme hardness and difficulty of working this metal, it has never found favour, although I have occasionally seen good sound fillings made with very thin platinum foil.

The researches of Mr. Alfred Tribe with regard to a curious property of most metals, will possibly enable platinum to be used as a satisfactory filling material. In a paper read by him before the Chemical Society he detailed a number of experiments which prove conclusively that most if not all metals have the power of combining with hydrogen when in a state of fine division, and thereby acquiring the property of agglomerating or welding without the aid of heat. Following up his experiments with platinum I found that it could be prepared in such a form that a perfectly welded plug could be made without any great difficulty in the mouth, and also that the plugs could be made perfectly sound and moisture tight.

That pure platinum has considerable advantages over gold both in colour and non-conducting power few, if any, will be inclined to dispute, and that it can be worked by following up Mr. Tribe's suggestions I have proved by making a number of really sound and perfect welded fillings. The only question which remains to be solved is, whether it can be prepared on a commercial scale in a form which will suit the requirements of operators accustomed to working gold. If this can be done (and so far as experiments go I see no great difficulty) there is little doubt that it will come into extended use. Mr. Tribe mentions that Mr. Oakley Coles has made an amalgam with finely divided hydrogenized platinum: this compound however does not appear to differ in properties from the amalgam made in the ordinary way with spongy platinum, although it is much easier to prepare.

ODONTOMES.

(Traite des Tumeurs. Par Paul Broca).

ODONTOMES GENERALLY.

(*Continued from page* 548, *Vol. II.*)

V.—HISTORICAL.

It was thus, that notwithstanding their perfect isolation, and the special nature of the accidents which they occasioned that dentified odontomes were maintained in the class of exostoses. When the tumour was surmounted by a well-shown dental crown, which is the case in radicular coronal odontomes, when it was evident that it had nothing to do with the maxillary bone, and that it took its rise from the tooth itself; it was acknowledged that it was not an ordinary exostoses, but it was supposed that the morbid mass was constituted by osseous tissue. The first author who recognized its dental origin and nature, if not the true cause of a dentified odontome is my venerable colleague of the Academy of Medicine, M. Oudet. In 1809, during his residence at the Hotel Dieu, he established in a man of 25 to 30 years of age in Pellehan's course for fracture of the clavicle, the existence of an elevated unequal tumour, hard and like stone, which made a projection in the place of the right inferior molars of the lower jaw. He practised the extraction of this irregular mass with the pelican and forceps, and perceived that it was formed by the reunion of a great number of unequal elevations, covered with enamel, and similar to the incomplete crowns of canine and incisors. Another tumour having the same appearance existed on the other side, but the patient would not submit to a second operation. In communicating later this remarkable fact to the Society of the Faculty of Medicine, M. Oudet emitted an opinion that "the tumour appeared to have been produced by the development and union as extraordinary as monstrous of several germs of the incisor and canine teeth." This case will be described and shown farther on; it will be seen that it is a question of an odontoplastic odontome, with multiplication of dental bulbs; but if we do not adopt the explanation given by M. Oudet, it is only just to recognize that he had the merit of attributing the origin of this odontome to the odontogenical periods, and of attributing to a monstrous development of dental bulbs, a lesion which up to that time had been confounded with exostosis of the jaw.

At the time this case of M. Oudet was published, the creator of anatomical philosophy, E'tienné, Geoffry-Saint-Hilaire executed his grand works on the unity of organic composition, and strove in particular to bring back to a uniform type all the dental appearances of mammals, and even of birds. To pass from the simple teeth of the human subject to the composite teeth of the elephant, and from these to the beak of a bird, it was sufficient to him to admit the more and more intimate and complete fusion of the dental germs, and to show the possibility of this fusion he borrowed from the ancient authors histories, such cases as the King Pyrrhus, whose upper teeth according to Plutarch were formed of one continuous bone. He would doubtless have preferred more modern and authentic observations; and judge after that the attention with which he would study M. Oudet's case. He did not hesitate to admit that "this monstrous block" was constituted by the fusion of many teeth, and added that it was the "perfect repetition" of the position of the last superior molar of the pig.*

This illusory theory had at least the advantage of leading to a search in comparitive anatomy of cases of dental monstrosities which we can utilize at the present time in the descriptions of odontomes. Upon a horse's tooth, 10 centimetres in size, he counted 80 small elevations "announcing so many dental elements; they are accumulated in every sense; it is an extricable confusion.†

For us, this remarkable case is an example of an odontoplastic odontome dentified with a multiplication of bulbs.‡ Another specimen prepared like the preceding one, by M. Emmanuel Rousseau, and taken from the upper jaw of a horse two years old, presented upon its surface "stratifications of waves (reeds) thick and dense."

It was a fine example of a coronal odontome.§

* Ét Geoffrey-Saint-Hillaire, "Système dentaire des mammifrères et des oisseaux," &c., 1st part, (the 2nd part has not appeared), Paris, 1824. Bound in 8vo. with a plate p. 33, and in Appendix, note 9, p. 77, and following, and in plate i. fig. 18.

† *Loc. cit.* p. 7, 9.

‡ The author proposed to show this case in a plate which was to accompany the second part, and which was not published. But M. Emmanual Rousseau has given a figure of this odontome in his treatise of *Comparative anatomy of the dental systems* (plate xxvi. fig. 7.

§ This case may be verified, and is really found at the Museum of

These important facts deposited in a transcendant history (memoir) of anatomy, and allied besides to a disputable theory did not attract the attention of surgeons, and added nothing to progress on the subject. There failed besides in the description of these osteoid productions, an essential element, which was the determination of their structure. They had been confounded, up to that time, with exostoses, and, to introduce another interpretation the aid of the microscope was necessary. I have reason to believe that none had studied the microscopical structure of a dentified odontome before M. Carl Wedl, author of a "Pathological Histology," published at Vienna, in 1853. I only know this work by Mr. Busk's English translation, published in London, 1855, by the Sydenham Society. At page 520, between the description of the stratified layers of cementum which are so frequently deposited on the fangs, and the microscopical lesions of caries may be found description of a maxillary tumour developed in the region of the wisdom tooth, and extracted without difficulty by Dr. Jarisch. A diagram inserted in the text plainly shows that the reference is to an odontoplastic odontome. With the naked eye may be already distinguished on the surface of the tumour portions covered with enamel, and other parts having the appearance of dentine. One section shows that the enamel tubes are irregularly prolonged in the thickness of the enamel in the midst of the mass of dentine. The existence of these dental tissues was proved by microscopical examination. M. Wedl concludes by saying, "The formation of this tooth can only be attributed to a *vitium primæ conformationis* consisting in the development of numerous papillary protrusions upon what Mr. Kölliker calls the organ of enamel (*organon admanitinæ*), protrusions adapted to corresponding protrusions in the dental pulp. But these papillæ of new formation have no fangs."*

Natural History in the gallery of comparative anatomy, fourth room, 1st floor, No. 1324. It is the fourth upper molar which is the seat of the tumour. Part of the crown of this tooth has been erupted, and has been worn by mastication, but that part replaced by the odontomes remains enclosed in the maxillary bone.

* Carl Wedl. "Pathologische Histologie," translated into English and entitled, "Rudiments of Pathological Histology," London, 1855, in 8vo., p. 250-253.

THE SURGERY OF THE MOUTH.

By FRANCIS MASON, F.R.C.S.,

SENIOR ASSISTANT-SURGEON AND LECTURER ON ANATOMY AT ST. THOMAS'S HOSPITAL.

(*Continued from vol. 2, page 546.*)

B. ACCUMULATION OF FLUID OF VARIOUS KINDS IN THE ANTRUM *(continued)*.

II. SUPPURATION IN THE ANTRUM.

This disease has been termed "abscess of the antrum," or "Empyema," and is, as we have already seen, relatively of much more frequent occurrence than Hydrops Antri, or dropsy of that part.

In many instances it seems to commence without any obvious cause, yet a blow or injury will occasion it, and, as a rule, it is connected in some way with diseased teeth, indeed Bordenave, in referring to diseases of the antrum, says, "La carie des dents est la cause de presque toutes les maladies du sinus maxillaire et de celles qui affectént les parties circonvoisines."* Another cause of suppuration is that an abscess at the root of one of the molar teeth will burst into the antrum. This is easy to understand when we consider how closely associated those teeth are with that cavity. In some cases, however, teeth more distantly situated seem to be the primary source of the actual mischief, thus Mr. Tomes saw a case where the extraction of a loose and painful central incisor gave exit to a quantity of exceedingly offensive pus; a probe passed through the vacant socket, entered the antrum through a canal as large as a goose quill.

The history of most of the cases of suppuration within the antrum is, that from some cause the membrane lining the cavity gets altered in character. Its surface is at first congested, and ultimately the opening into the nares becomes completely obstructed. But the converse of this will sometimes happen; thus the inflammatory mischief may commence in the nose as a severe coryza or as a polypoid growth, and extend by continuity of tissue into the antrum.

About four years ago I saw a child, seven years of age,

* Précis d'observation sur les maladies du sinus maxillaire. Par M. Bordenave.

who had introduced a piece of slate pencil into his nose. This was followed by the most acute inflammation in the right antrum, with profuse discharge from the nostril. There was no doubt that the pus came from the antrum, for the external appearances pointed characteristically to that part, and a bent probe could be readily passed into the cavity through an opening in the nasal wall large enough to admit the point of the little finger.

The size of the antrum varies greatly in different individuals, and so also does the opening between it and the nostril. I have examined numerous examples in the dead subject and am convinced on these points. Occasionally, but not so frequently as I should have expected, I have observed thin plates of bone projecting more or less into the antrum.

Suppuration may be induced by the presence of some foreign body, such as a tooth or bullet, or a portion of diseased bone getting impacted in the walls of the antrum or in the septa just referred to. Mr. Cattlin* and M. Giraldes allude to such cases, but the following example reported by Mr. H. Walton, is of sufficient interest to be quoted:—

"The patient was a man aged 35, who, three and a-half years before, had a fall, and lost his right upper lateral incisor. He had much pain, and a few weeks later an abscess formed, which discharged through a small opening in the cheek as well as through the alveolus of a lost tooth. Then another abscess formed, leaving a sinus open in right cheek. On probing this, a hard substance was found, the wound was opened up, and a perfect incisor tooth lying loose in the antrum was removed." The patient did well.†

Again, suppuration may proceed from a fracture, thus in the Medical Times and Gazette for 1848, Page 222, a case of this kind is communicated by Mr. J. L. Levison Broughton. The patient was a woman, aged 20, who fell ten years previously and got necrosis of her upper jaw and caries of the second molar tooth. The tooth was extracted and a quantity of matter came away from the antrum. The antrum was injected with a lotion of chloride of zinc, and the patient made an excellent recovery. Mr. Stanley also

* *Brit. Med. Journal*, June 21, 1858.

† *Medical Times and Gazette.* Nov. 6, 1869.

quotes another case which shows the importance of making a preliminary puncture in all examples in which the least doubt exists. "A child, a patient of M. Gensoul's, had a large tumour in the cheek; the arch of the palate was depressed, the nostril closed, and the nose pushed to the opposite side of the face. It was determined to remove the superior maxillary bone. The incision in the soft part had been made, when it occurred to M. Gensoul to pass an instrument into the tumour before dividing the bone. A yellow fluid escaped from the antrum, and on freely opening its cavity, the canine tooth was found lying in the bottom of the cavity, and adhering to its walls."*

The *symptoms* are by no means alike in all cases, hence the diagnosis is often most difficult. The patient generally complains of some neuralgia, and after a time, there is a sense of fulness in the region of the antrum, and then a perceptible projection forwards of its anterior wall. Pressure on to the superior maxillary bone from within the mouth gives some pain, and this part subsequently becomes thinned, and then indistinct fluctuation is detected.

The palate in severe cases, is markedly convex, but it by no means follows that the orbital plate is so displaced as to cause a projection of the eyelid. I have seen several cases in which the anterior wall has been distended, and in which the orbit has not been in the least implicated, and I agree with Mr. H. Walton who says, "suppuration may greatly enlarge the maxillary sinus without throwing up the orbital boundary."†

The pain may be of an acute character, or it may be dull and throbbing. In a case recorded by Mr. T. Smith, there was "considerable protrusion" of the eye and cheek, and "most agonising pain." ‡ Yet on the other hand, pain may be entirely absent, as in a case under the care of Sir Wm. Lawrence, quoted by Mr. Stanley,§ which is a fair example of the disease under our notice, and shows also the difficulty of diagnosis. "The patient was a woman aged 24, who was admitted with a large, hard, round swelling of the cheek, in the situation of the antrum; it

* Stanley, "Diseases of bones."
† *Brit. Med. Journal*, December 31, 1864.
‡ *Brit. Med. Journal*, September 7, 1872.
§ "Diseases of bones," p. 285.

was *free* from pain, and the soft parts covering it were healthy. It was of such solidity and hardness, that it was supposed to be an osseous growth from the antrum. It commenced after a blow received five months previously, and had slowly increased in size. A scalpel was thrust into the tumour immediately above the socket of the molar teeth, and healthy pus flowed from the opening, subsequently the swelling subsided, and the antrum returned to its natural limits."

As the disease progresses, the common indication of deep-seated inflammation may generally be observed—that is œdema, especially of the eyelid. The surgeon knows that there is no surer signs of serious deep-seated mischief in the soft tissues, than when the skin has a brawny, white, wax-like appearance, and when it "pits on pressure." In suppuration of the antrum, although the conditions can scarcely be called strictly analogous, this symptom of œdema, will, in many cases, materially aid the diagnosis. Again, in suspected suppuration of the soft tissues we attach some importance to the critical rigor, but this symptom, although the fever may run high, is in suppuration of the antrum often conspicuous by its absence. The conjunctiva frequently becomes red and turgid, and a point that will sometimes attract the patient's attention, is that the opposed molar teeth cannot be closed without discomfort; those of the upper jaw projecting beyond the level of their neighbours, and rendering mastication on the affected side impossible. Percussion of one or other of the molars will often cause pain. The teeth in suppuration of the antrum, are, as a rule, firmly fixed, and this point will assist the surgeon to distinguish between a collection of matter and a malignant tumour of the part. In the latter, the teeth are usually loose, and on pressing them, they rebound slightly, as if by elasticity. In one case under my care, the patient who was an intelligent medical student stated that when he lifted his head from the pillow he detected a splashing sensation in the antrum, and on lying in one particular position a sero-purulent discharge would come from his nostril. In many instances there is no discharge from the nostril, for, as already stated, the aperture of communication between the antrum and the nose may be so swollen as to prevent the exit of the fluid. Doubtless, the most reliable symptom is a discharge of matter after the removal of a tooth.

The symptoms being so variable, the *diagnosis* must of necessity be often most difficult. The commonest error is to mistake a case of chronic suppuration for a tumour or a malignant growth in the antrum. In the latter, there is generally a thin unhealthy discharge differing from the creamy pus of suppuration. The teeth, too, in malignant disease are loose, and bleed if lightly touched, and the growth is not so completely limited to the antrum. The tumour spreads rapidly in various directions. Polypus of the nostrils again may give rise to anomalous symptoms, and the surgeon in all cases of doubt, should not fail to examine the back of the fauces, not with the eye alone, but with the finger placed behind the soft palate. By remembering this point, I have on several occasions detected polypus attached to one or both posterior nares. In more doubtful cases, the rhinoscope may be usefully employed. The diagnosis is rendered difficult when the bone becomes thickened, for then we lose fluctuation which is no unimportant symptom, but generally, as already stated, the anterior wall is thinned, and the finger detects numerous bony plates of various degrees of thickness. The physical signs will perhaps be better understood by the following case which is so instructive on many points that I venture to give it *in extenso*:—

"A middle-aged woman was admitted under Mr. H. Smith's care, at King's College Hospital, with a large swelling on the right cheek, which was pronounced after examination by Sir W. Fergusson and Mr. Smith, to be probably due to the development of a malignant tumour in the antrum Highmori. There being no enlargement of the glands under the jaw, the case was thought to be a favourable one for excision of the upper jaw. Fortunately, however, while the patient was in the hospital, she had an attack of erysipelas of the face, which lasted between two and three weeks; and at the end of this time, the swelling of the cheek which had increased considerably, diminished suddenly on the bursting of an abscess beneath the under eyelid. This materially altered the view taken of the case, and then all idea of removing the upper jaw was abandoned. As the swelling in the cheek, however, did not disappear entirely after another three weeks had elapsed, Mr. Smith performed the usual operation for evacuating any fluid matter pent up within the antrum.

The second molar tooth was extracted, and a large triangular trocar was pushed up its socket. No pus came away, and after nipping away a portion of the alveolar ridge, so as to be able to pass a finger into the antrum, the cause of the mischief was to be found to be necrosis of a portion of the bony wall of the antrum, which part was consequently removed. The case is of considerable interest, as showing the difficulty of making a sure diagnosis between disease calling for removal of the upper jaw, and disease limited to a portion of the maxilla only. It teaches this lesson, that in all instances in which the least doubt exists as to the nature of the affection, a preparatory puncture should be made into the antrum by means of a perforation, either pushed through the socket of a tooth, or through the canine fossa under the cheek."*

In former papers, I have attempted to point out the importance of seeking for the cause of any anomalous symptom. I have shown that amaurosis, deafness, neuralgia, and sinuses etc. are traceable to diseased teeth, and that extraction of the offending tooth has in many instances been followed by a complete cure. Sinuses and many anomalous symptoms are equally traceable to disease of the antrum, thus a lady, aged 30, was under my care in September, 1872, with a fistulous opening on the left side of the nose. A probe introduced, passed readily into the antrum. All the teeth on the corresponding side were apparently healthy, and being unwilling to sacrifice one of the molars, I punctured the antrum from the mouth in the canine fossa with a joiner's gimlet. This was readily effected, for the probe passed from the external opening to the anterior wall which it protruded, and which formed a *point d'appui* for the gimlet. The opening in the skin speedily healed, and the patient quite recovered in about six weeks. Subsequently an adhesion in the site of the sinus was divided with marked improvement to the features.

Mr. W. Hayward has reported three interesting cases† which bear on this point.:—The first was a boy four years old, in whom, after pain in the upper jaw, and discharge from the nostril, the antrum became distended, and an opening formed on the prominence of the cheek. The treatment consisted in puncturing the antrum through a tooth socket,

* *Brit. Med. Journal*, March 2, 1867.
† *Lancet*, March 16th, 1872.

and syringing the cavity with astringents. The second patient, aged 26, had what he thought to be a boil on the cheek, which during eight months had discharged matter. This proved to be an opening leading to the antrum. The third patient had a solid tumour growing from the alveolar margin of the upper jaw, together with great distension of the antrum. The tumour was removed, and the antrum punctured to evacuate the fluid.

Acute inflammation and suppuration of the antrum are often followed by troublesome consequences. The diagnosis being difficult, we have to wait in many cases to ascertain the real nature of the disease. If the case runs its own course, the pus will make its way in many directions. It may escape into the nose through either the usual aperture, or through an opening made by a process of absorption in the nasal wall. It may evacuate itself through some toothless socket, or the matter may insinuate itself by the side of a fang, when the surgeon may possibly think the case one of simple alveolar abscess. The more serious cases end perhaps, as an abscess in the cheek, or the matter may point just within the orbit, and then an ugly, yet characteristic cicatrix remains after the cure is completed. The skin is "tucked in," so to speak, the remedy for which is to insert subcutaneously a narrow knife and divide the cicatricial band. This simple operation suffices to effect a permanent cure.* In other cases, again, necrosis of a portion of the upper jaw may take place, and then the discharge has the peculiar odour, which, if once appreciated, is never to be forgotten. It is not often that suppuration within the antrum is attended by fatal consequences, but death may result from intracranial suppuration; an instance of which will be found in Mr. Heath's work.†

A form of blindness—amaurosis—will sometimes follow acute inflammation or suppuration in the antrum, the ophthalmoscope, however, revealing no structural change further than Anœmia of the optic disc. This condition may be temporary or permanent, the ultimate result depending upon the intensity of the inflammatory action. The reader is referred to numerous papers on the effects

* See *Monthly Rev. Dent. Surgery*, Feb. 1873. "Art. Surgery of the Mouth."

† Injuries and Diseases of Jaws. Appendix Case 12.

produced by carious teeth, and by diseases of the antrum.*

In the *treatment* of sinuses communicating with the antrum, we have to adopt a different method to that usually employed in dealing with sinuses, leading to dead bone, &c., in other parts of the body. Thus, supposing we wish to remove a portion of necrosed bone from the tibia, we slit up the sinuses with a knife, and thus reach the foreign body, but in the case of suppuration in the antrum with a fistulous opening in the cheek, we purposely make a counter-puncture in the mouth, and by keeping this puncture pervious, the opening in the cheek ultimately closes.

The diagnosis being so difficult, the all-important point is, in doubtful cases, to make a tentative puncture to ascertain whether the swelling is due to a collection of fluid, or to a solid tumour, for the two conditions require a widely different method of treatment. In treating cases of suppuration within the antrum, two methods are open to the surgeon. In one, a molar, generally the first, is extracted, and the alveolar cavity opened with a trochar or other strong instrument into the antrum. In the other, a better plan, especially if the molar teeth are sound, and in all cases of edentulous jaw, an opening is made with a joiner's gimlet into the antral cavity, either through the canine fossa or near the molar process of the superior maxillary bone. This has already been referred to in a previous paper.†

The gimlet is safer to use than the trochar and canula, inasmuch as with the latter, there is some risk, in making the plunge, of injuring the floor of the orbit. The opening should be free, so that any discharge or decomposing

* See "On cases connected with the Teeth," by H. Hancock. *Lancet*, Jan. 22, 1859.

"Contributions to Dental Surgery," by S. Adams Parker. *Brit. Med. Jour.*, May 30, 1863.

"Amaurosis consequent on Acute Abscess of Antrum," by James Salter." *Brit. Med. Jour.*, July 19, 1862.

"Anœmia of Optic Nerve, and Amaurosis following Abscess of Antrum." *Brit. Med. Jour.*, Dec. 30, 1865.

"Some of the Effects produced by Carious Teeth," by Samuel Smith. *Lancet*, Feb. 14, 1857.

"Practical Surgery," by Sir W. Fergusson, 5th ed., p. 595.

† See *Monthly Rev. Dent. Surgery*, May 1874. "Art. Surgery of the Mouth."

material may have a ready exit. The cavity must be washed out frequently with warm water, and afterwards with a suitable lotion, either astringent or antiseptic, and the patient should be enjoined not to allow during mastication food to enter the antrum. The last named circumstance will now and then occur, thus, in a case of expansion of the antrum of Highmori read before the Clinical Society, Mr. C. H. Moore concluded that the cause of the expansion lay in the communication of the bony antrum with the mouth, and that the peculiar substance in the antrum was driven up by mastication through the socket of a healthy molar tooth. This substance had thus obliterated the antrum as a mucous cavity. A vulcanite tube being worn in the opening which had been made with the knife, and frequent cleansing of the cavity practised, the bony expanded shell of the tumour receded, and in a few months the natural form of the features was restored.*

Various kinds of plugs may be employed. Mr. Tomes recommends a wax one, but vulcanite answers as well as any other material. I append Mr. Salter's description of the plug he is in the habit of using, which will be read with interest by the practical surgeon-dentist:

"After the perforation through the alveolar cavity has been made, I have taken a model, and a plate has been prepared to pass over the space occupied by the extracted tooth, and fastened to the contiguous teeth by the customary metallic bands. Through this plate a hole has been bored, which corresponds with the orifice in the antrum; and to the applied surface of the plate a very short tube has been soldered, sufficiently long just to enter the antrum, to occupy the perforation, and prevent its closure. This plate has been permanently fixed during the active treatment of the case, and the orifice in the tube has been kept closed by a plug of cork in the intervals between using the injection. By the removal of the cork, the nozzle of the syringe, which fitted the tube, could be applied, and the injection used any number of times, the tube being sufficiently short to allow the complete washing out of the cavity, and the escape of the fluid."†

* *Lancet*, March 26, 1870.

† "Surgical Diseases connected with the teeth." By James Salter. Holmes's System of Surgery, vol. iv.

COHESIVE GOLD.

By THOS. FLETCHER, F.C.S.

Mr. Palmer's article in last issue was written under the impression that I have not been able to make any moisture-tight plugs of cohesive gold. In this he is mistaken, as I have made more than I have received from all other sources put together.

In stating that it was easy to use, no reference was made to time, but to the fact that it can be readily worked where non-adhesive foil is unmanageable.

The tests were made, not with cohesive gold alone, but with soft, cohesive, and good amalgams both in and out of the mouth; the result agreed closely as regards theoretical tests, and they are borne out practically in almost every case which comes under my notice in the mouth, although there are occasional exceptions.

The experiments were undertaken with the object of finding out, if possible, the cause of failure of cohesive gold fillings, which has, I believe been wrongly attributed to expansion and contraction from varying temperatures. Their value is a question of opinion; I may or may not have found the cause.

In stating or implying that amalgam plugs are not moisture-tight when properly made, Mr. Palmer is certainly in error, as a very simple experiment will prove. With regard to the permanent value of amalgam as compared with cohesive gold, taking average results, I am of opinion that both materials have been and are now, to a great extent, used in blind faith by most operators, who have never taken the trouble to test the proper preparation of the materials and the best means to get good results. Tight cohesive gold plugs are possible, but very rarely obtained; tight amalgam plugs can be obtained with proper materials where tight cohesive gold plugs can not.

With regard to glass tubes I can only repeat that I do not specially advise their use (my reason for using them was given), and that they will stand as much malleting and rough usage as can be applied to teeth in the mouth, as a rule.

I hold that a moisture-tight plug is safe for ever, so far as its own cavity is concerned; not that a plug on one side of a tooth will protect the other as he appears to understand.

Mr. Palmer states that it is "quite certain that a perfectly sound and healthy tooth is moisture-tight." To take this literally would, I believe, be doing an injustice to your correspondent, as I do not think he intends to make such an assertion. He is, however, plainly of opinion that a plug made tight at the edges only, is reliable, and proof against the admission of moisture. On this point we must agree to differ, as I do not believe such work is of real value in the mouth. Is it possible that Mr. Palmer's faith in such fillings has any connexion with, or is in any degree referable to the difficulty of obtaining with cohesive foil a filling which is moisture-tight throughout?

The further solution of the adhesive gold question may be safely left to those operators who have taken it up without prejudice, and who are willing to repeat the tests, estimating them and their own skill according to the results. Mr. Palmer appears to have misunderstood many of my statements, giving them in his own mind a meaning they were not intended to bear, and as I do not wish to waste valuable space in a useless theoretical discussion, I here recapitulate my views on the subject, which any operator may readily prove for himself if he is so disposed.

In filling teeth, the first essential is that the plug shall be moisture-tight throughout, and all fillings which have remained sound in the mouth for 15 or 20 years, will be found to be so (unless, as with Sullivan's, they are protected by chemical action). By the use of a proper amalgam this essential point may be obtained with such certainty, that any operator possessing ordinary skill may succeed in all cases, the nature of the material being such that it adapts itself to the inside contour of the cavity without any extraordinary expenditure of labour and skill on the part of the operator. With cohesive gold it can also be accomplished, but the practical tests show clearly that even in the best hands success has been extremely rare. The first duty of a dentist is the absolute protection of every cavity, and it is certainly one which has not been performed up to the present time.

Since the above was written, I have again gone into the question of adhesive gold with the determination to master the conditions necessary for uniform success. That I have at last found these there can be no question, but it is too early to speak positively on all points. I will,

however, now undertake to make uniformly sound and moisture-tight plugs with invariable success, quite as quickly as I can use non-adhesive foil or tin, with either S. S. White's extra cohesive foil fully annealed, or with any other make. This may be nothing new to Mr. Palmer, but judging from the plugs sent to me for examination, it is what very few operators can do under the present system of working.

ON MECHANICAL APPLIANCES FOR THE TREATMENT OF FRACTURES OF THE JAWS.

(Guy's Hospital Report.)

By HENRY MOON, M.R.C.S., L.D.S.

ASSISTANT DENTAL SURGEON TO GUY'S HOSPITAL AND TO THE LONDON DENTAL HOSPITAL.

In the following paper it is proposed to describe certain appliances used in some cases of fractured jaw, which have been treated in Guy's Hospital during the past year, but before reference is made to particular cases, the desirability of treating fracture of the jaws generally by means of a well-adapted splint *within the mouth* will be advanced.

In the treatment of these cases ingenuity too often seems to have exhausted itself, when a piece of gutta percha has been moulded to the chin, and an ill-fitting wedge of cork placed between the teeth, where it seldom remains for more than a few days; or the teeth adjoining the fracture are wired together; such rough and ready methods as these, while they are not the most effective and comfortable means of setting in slight cases, altogether fail in a really difficult case, *i.e.* where there is a strong tendency to displacement of the fragments.

Mr. C. Heath in his excellent essay on "Injuries and Diseases of the Jaws" quotes and coincides with the opinion of Sir W. Fergusson and other surgeons:—"That the majority of cases do well with merely the simple bandage not very tightly applied. From this dictum, if "doing well" means doing as well as they might do, I must—with all respect for the authority quoted—altogther dissent, and from among other cases which bear upon this point I will allude to two. The first was a case of fracture of the lower jaw *without displacement*—the patient—a young woman, of fairly healthy appearance, applied lately for advice in the

surgery at Guy's. She complained of pain between the left bicuspid teeth, at the point where her jaw had been fractured two months previously. There was no displacement, but crepitus could still be felt; this fracture had been treated without an interdental splint. The second instance is that of a man, who some year or two ago was in one of our wards, and who among other severe injuries had a fracture of the lower jaw in front of the the left canine tooth. This fracture, without any special treatment, at the end of eight weeks, when first I saw it, had not united in the slightest degree, the posterior fragmeut being at least three quarters of an inch higher than the anterior. The jaw was set, and a metal cap fitted to the teeth, and then at the end of six weeks good union was found to have taken place.

A properly made interdental splint tends to shorten the time required for union, averts pain, and prevents the formation of pus, which, when formed at the point of fracture, is apt to pocket in the soft parts around, and lastly, it insures the restoration of the exact form of the unfractured jaw. The last named result is of the first importance, as displacement by even a quarter of an inch will suffice to destroy the proper articulation of the teeth, and may cause considerable deformity and much discomfort to the patient.

For a description of the different oral splints which have been used, the reader is referred to Mr. Heath's work above named. In it are figured the several kinds alluded to in the following pages. The variety in form of the splints is due to the different devices employed for fixing them, but the principle on which they all act is that of holding the jaw in position by means of a cap accurately fitting the teeth on either side of the fracture. To make such a splint we must first have a perfectly correct model of the jaw as it was before it was fractured, and to obtain this when, as often happens, it is impossible to hold the several portions of the jaw in position while an impression is taken, the following plan is adopted. A plaster of Paris counterpart of the upper or unfractured jaw is made in the usual way. An impression of the fractured jaw is taken without the fragments being brought into place, and a plaster model made from it—then, if the displacement is simply vertical, the model is sawn in two at the point of fracture and the two parts joined together again at their proper level; if

there is longitudinal separation, as well as vertical displacement, the divided ends of the model, before they are rejoined, are pared down, and the two portions are brought into true position by articulating the teeth on them with their antagonist teeth of the other jaw. By the above means, if there be anything like a full complement of teeth in the jaws, this rectification of displacement can be carried out with great accuracy.

The best material with which to take impressions in these cases is "Stent"—a composition which is introduced into the mouth in a soft state, and in the course of a minute or two becomes hard, and therefore not subject to be put out of shape on withdrawal. It will often be found necessary to use an impression tray that is adapted to take only half the jaw.

Interdental splints may be made of vulcanite or of metal; if of the latter, gold may be used, but "dental alloy" answers the purpose perfectly. We will suppose a fracture between the second bicuspid and the first molar tooth of the lower jaw; here we should probably have the posterior fragment considerably higher than the anterior. A metal cap should be fitted to the amended model accurately adapted to all inequalities of the teeth, and passing for a quarter of an inch or so over the gum on the inner surface, and rather more on the outer; the number of teeth to be included in the splint would depend on the nature of the displacement; if it is simply vertical and not very difficult of reduction, the capping of two teeth on either side of the fracture will suffice, but if the fracture is oblique, some force may be required to keep the fragments from overriding each other, and in such a case it may be desirable to extend the splint from the symphysis to the last molar. The metal cap should be strong enough to be quite unyielding, and its edges should be smoothly rounded.

If the model on which it has been made is correct, it is evident that as long as this splint is kept in position (which can be judged of by its fitting closely down upon the teeth at both ends), the most perfect setting of the fracture is insured. To retain the splint in position, I have adopted the following methods—modifications of, and I think, improvements on the plans that have hitherto been in use. Taking the case imagined, the masticatory surface of the metal cap having been brought to a level by soldering on

metal where required, a vulcanite cap is made to fit the upper teeth which correspond to those capped below The vulcanite should fit over the gum on the buccal surface, and on the lingual side should be fitted to the palate. The cap on the masticatory surface of the teeth is much thicker anteriorly, and gradually thins towards the back of the mouth, making, in fact, a wedge, which, when in place, will remain immovable. In applying it, the metal splint is held firmly down, so as to keep the fracture in position, and then the vulcanite wedge is introduced, and, by being filed, if necessary, is made to exert an even bearing on the upper surface of the metal splint. A thickness of vulcanite is left sufficient to keep the mouth open just wide enough to admit of the introduction of food. A four-tailed bandage is then firmly applied with a coronal band stitched to it to prevent slipping, or the bandage devised by Hamilton may be used. Of course, in a case where the jaw is fractured on both sides, the metal splint is carried round so as to include both fractures, and then the vulcanite wedges should be made to cap the back teeth on both sides, and be united by vulcanite passing round behind the front teeth, thus leaving room for the introduction of food in the front of the mouth. (A frame of this kind is constantly used by dentists in regulating children's front teeth.) Mr. Gunning, of New York, introduced an interdental splint for fractures with vertical displacement. This splint—made of vulcanite in *one* piece —was adapted to cap in the teeth and gums of both jaws, an opening being left in the front for feeding, speech, &c.; but I find the separate wedge-shaped cap answers perfectly as a retainer, while it takes up less room in the mouth, and gets over the practical difficulty of introducing a large apparatus in one piece into the mouth. It also avoids the difficulty that will be found in making such an apparatus with the exactitude necessary as regards the relative position of the jaws.

(To be continued.)

MODIFICATION OF THE OPERATION FOR HARE-LIP.

On two successive Saturdays Sir William Fergusson has recently demonstrated to the students of King's College, London, a model modification of the ordinary operation for hare-lip. The cases in which he carried out this plan were

of the usual type, the fissure being, as in the majority of instances, on the left side; and in both it was considered advisable to take away the intermaxillary bone. This adds to the success of the operation, not only by removing an occasional obstacle to primary union, but because the teeth, which are subsequently developed from the protecting knob, are worse than useless, by reason of their deficient development and faulty position. Instead, however, of removing the portion of bone readily with the knife or bone forceps, it had occurred to Sir William that it would be much better to operate subcutaneously, so to speak, by stripping off and retaining the mucous membrane; and accordingly this was done, with perfect success, the bone shelling out readily from its investment. Not only will this procedure greatly accelerate the subsequent process of healing, but the advantage is obvious of retaining a thick and firm mucous surface in preference to the more artificial substitute of cicatricial tissue.—*Brit. Med. Journal.*

DENTAL PATENTS.

[*The Dental Advertiser.*]

[*Under this head we publish, as items of news, the names and claims of all patents, relating to Dentistry, issued for the quarter preceding the publication of this Journal.*]

145,274—Dec. 9, 1873.—METALLIC FOIL FOR DENTAL PURPOSES.—Chas. E. Blake, San Francisco, Cal.

Claim.—As a new article of manufacture, platinum foil or leaf coated with gold, either upon one or both sides, substantially as and for the purpose above described.

145,275—Dec. 9, 1873.—DENTAL FILLING.—Chas. E. Blake, San Francisco, Cal.

Claim.—A filling for teeth, consisting of the usual base, covered with a stratum of platinum or other metal approximating to the color of the color of the teeth, as set forth.

145,982—Dec. 30, 1873.—FILLING FOR DECAYED TEETH.—Chas. E. Blake, San Francisco, Cal.

Claim.—The alloy of platinum and gold for the purpose of providing an improved dental gold, substantially as above specified.

146,233—Jan. 6, 1874.—ALLOY FOR DENTAL PLATES.—Edward Conway, Dayton, Ohio.

The bismuth, tin, and lead are purified by separately melting and pouring upon clean marble slabs until all dross is removed, and afterwards melting and pouring into lemon juice.

Claim.—An alloy composed of platinum, gold, silver, bismuth, tin and lead, in substantially the proportions and for the purposes specified herein.

METALLIC ENAMEL.

Dr. Blake, of San Francisco, professes to have discovered a method by which the crowns of teeth lost by abrasion, fracture, &c., can be restored by what is termed a metallic enamel, which is so shaded as to blend with the natural color of the tooth; it is described as follows:

Of late years the desire among dentists has been to save teeth by filling, not only when decay has taken place, but also in the case of persons of mature age, when the enamel or grinding surfaces are entirely worn off. In such instances the dentine or bony structure soon shows wear, and in a comparative short time there is not much of a tooth left above the gums. This is a source of annoyance to persons in such condition. A few years ago, when a patient's teeth were worn down or broken off, recourse was had to a metallic or rubber plate, after the bad teeth had been extracted. These plates are always more or less uncomfortable and quite expensive. Now, the art of dentistry is so perfected that the teeth can be built up, or capped with gold, giving to the patient many more years' use of his natural teeth than by the old method of substitution, or employing artificial teeth.

In front fillings, where the tooth is thus built up to its natural shape, the gold must necessarily be conspicuous, and many persons naturally object to this prominent exhibition of shining gold. This objection, however, is now overcome entirely by the invention of Dr. Chas. E. Blake, which consists of a metallic enamel, so shading the natural color of the gold, that the bright yellow luster of the metal is changed or toned down, so as to blend with the color of the tooth. This process can be performed after the tooth has already been filled in the ordinary manner with gold. The coloring material can be inserted with the gold, and when finished, the blending together of the two metals skilfully will give any desired shade to the filling, to correspond with the color of any particular tooth. Of its durability there can be no doubt, as the material used is platinum, a white and pure metal.

No great amount of skill is required to produce a desirable shade by the alternate use of the two metals, one white and the other yellow. Gold foil is not used.

Very thin plates of gold and platinum, alternating, are used and thoroughly incorporated together in filling. The platinum is plated with a thin covering of gold, so as to make it adhere closely. It is prepared in sheets from the pure metal. The finished surface is perfectly hard and solid, giving a grinding face to the tooth, which is very durable.—*Dental Cosmos.*

DEATH FROM CHLOROFORM.

[*The Dental Advertiser.*]

We find the following in the *Cuba* (Allegany Co.) *Herald*, in relation to the death of Samuel Story, Jr., which occurred in the office of Dr. G. Whipple, on the 19th of March:

"It appears that, for some time, Mr. Story had been annoyed by a troublesome tooth, and he wished to have it extracted while rendered oblivious to pain through the agency of chloroform. Yesterday he visited Dr. Whipple's office for the purpose of having this tooth removed; and seating himself in the dental chair, indulged in some general inquiries concerning the effects of chloroform. Dr. Young, at Dr. Whipple's request, was soon after summoned and directed to administer chloroform to Mr. Story. To the inquiry of Dr. Young: "Have you the heart disease?" Mr. Story replied in the negative. A cloth was then saturated with chloroform, the Doctor administered it cautiously, and in a reduced quantity, employing only two drachms for the operation. At first Mr. Story did not appear to be effected; but in a few moments, although apparently conscious, it became evident that he was slightly under the influence of the deadly drug. Chas. Shepard was holding one of Mr. Story's hands and feeling of his pulse, which was beating full and regularly, when suddenly the head of the deceased fell backward, and his pulse ceased to beat. Restoratives were immediately applied, and medical aid summoned, but all to no avail, for Mr. Story was dead, having expired without a groan or making a sign that death was near."

LONDON DENTAL HOSPITAL.

CASES TREATED FROM MAY 1ST TO 31ST, 1874.

Extractions. Children under 14	299
Adults	408
Under Nitrous Oxide	207
Gold Stoppings	119
White Foil ditto	73
Plastic ditto	38
Irregularities of the Teeth treated surgically and mechanically	66
Miscellaneous Cases	153
Advice Cases	40
Total	1503

ASHLEY GIBBINGS, *House Surgeon.*

APPOINTMENTS.

Ashley Wm. Barrett, Esq., M.B., M.R.C.S., L.D.S., to be Dental Surgeon to the London Hospital, *vice* H. T. Barrett, M.R.C.S., L.D.S., resigned.

ROYAL COLLEGE OF SURGEONS.

Mr. Alexander Cartwright, of Old Burlington Street, was admitted a Member of the College on Tuesday, 26th May, 1874, after having passed the required examination for the Diploma.

AT the Examinations held at the Royal College of Surgeons on the 25th April and May 1st, Mr. H. Charles Smale, L.D.S., of Manchester, successfully passed the primary examination in Anatomy and Physiology.

EXPLANATION.

Under the head of new inventions in the May number of the Review, we noticed a miniature mortar board made of ivory for carrying ostio-plastic stoppings. By a mistake on the part of those who brought it under our notice, we said that it was the invention of Dr. Evans, of Paris, we should have stated that it was invented by Mr. J. Evans, of Albany Street, and manufactured and brought out in the first instance, by Messrs. Ash & Sons. In so far as we unknowingly did all those gentlemen concerned in this matter an injustice, we beg them to accept the assurance of our regret.

NOTICE.

From the pressure on our space this month we are compelled to defer the publication of Mr. Oakley Coles' Paper and the Report of the Odontological Society.

CORRESPONDENCE.

THE PROJECTED TESTIMONIAL TO MR. SAUNDERS.

SIR,—As this subject has been broached in the last issue of the *British Journal of Dental Science*, it may seem that I ought to have addressed my remarks to the Editor of that periodical: but as I am sure you will cordially support the movement, and as the *British Journal* will not appear again until a month hence, I beg a small space from you to ventilate the matter a little.

It seems to me that although the idea of a testimonial to Mr. Saunders must have been latent in the minds of many who have witnessed his indomitable, but placid perseverence in effecting the changes which he has been mainly instrumental in carrying out in the London Dental Hospital, the present movement has been, as it were, sprung upon the profession, and, I venture to say, rather inopportunely. The sound of the trowel and hammer has hardly yet died away from the new building; the Building Committee has not yet ceased collecting subscriptions, and there has not yet appeared any detailed account of the income and expenditure of the Committee. I think it would have been more seemly had there been a little less haste, and that the completion of the work had been waited for before taking such a step as this. Again, I think a great mistake has been made in the assumption of authority made by the projectors of the Testimonial. If every member of the profession were as well acquainted with Mr. Ibbetson and Mr. Harding as many of us in London have the good fortune to be, there might be no hesitation on the part of members to subscribe, but I can readily imagine a would-be subscriber saying, "Who are these gentlemen? Who authorized them to collect money? And who limited the subscription to a guinea? And what will they do with it when they get it? Who is to be the sculptor of the bust? And has Mr. Saunders consented to sit for his portrait to be cut in stone? What does he say to the whole thing?" These are some of the things a man would like to, and has a right to know, before being asked to give his money for any object, however laudable.

I think it would have been more respectful to the profession, and to Mr. Saunders, had a Committee of some of the leading London and Provincial practitioners been formed first, to have asked the permission of that gentleman, and then to have laid the matter before the profession in a business-like manner, instead of by a curt letter in a journal which, unfortunately, is not seen by one half of the profession at home or abroad.

I do not suppose that your journal is more extensively read than your contemporary, for our profession is very careless of its literature, still I think the sooner attention is called to the business the better, and so I take the only means I have in my power of doing so. I trust some of our leading men will come forward and rescue from failure this well-meant, but unfortunately mismanaged movement.

A SUBSCRIBER TO BOTH JOURNALS.

TO CORRESPONDENTS.

ALL communications intended for the Editor should be addressed to the care of Messrs. SMITH, ELDER & Co., 15, Waterloo Place, Pall Mall.

All inquiries respecting Advertisements and Subscriptions should be sent to Mr. GEORGE BUTCHER, 4, Crane Court, Fleet Street, E.C.

THE MONTHLY REVIEW
OF
DENTAL SURGERY.

No. II. JULY, 1874. Vol. III.

THE DENTAL DIPLOMA.

The profession in this country may be congratulated on the successful termination of one of the most important movements of the last ten years.

A Petition drawn up by the Dental Diploma Committee (and signed by over two hundred representative members of the profession), praying that the Royal College of Surgeons would admit to examination, without Curriculum, those who had entered the profession prior to September 8th, 1859, has been favourably received, and after full consideration the Council have been pleased to grant the privilege desired. It is not necessary for us now to enter into the history of what has been called the the Dental Diploma movement, as those who desire to make themselves acquainted with all its details, can do so by reading a pamphlet written, some few years back, by Mr. Charles James Fox, entitled the "Dental Diploma Qestion."

It is only desirable that we should mention that the Royal College of Surgeons, after obtaining in 1859 power to issue, upon certain conditions, Diplomas in Dental Surgery, at the end of four years declined to receive for examination, those who had been in practice prior to the granting of the Charter of 1859, unless they fulfilled a curriculum, drawn up by the College of Surgeons.

Certain reasons operated to keep a large number of respectable, and some eminent members of the profession, from accepting these terms, and a limited number only availed themselves of the privilege of examination, (without curriculum) within the four years. Those who remained without the diploma (although they had the opportunity of taking it during four years), had grounds for complaint as soon as the prohibitory resolution in Council was passed, since it is against both precedent and policy, for *medical* legislation, at any rate, to be retrospective. Nevertheless the Charter, referring to Dental Diplomas, was made so by the College refusing, at the end of four years, to admit to examination, those who, before the expiration of that time, had the right to claim the privilege of examination, without carrying out any curriculum.

Four years ago, at the suggestion of Mr. Fox, and through the medium of the *British Journal of Dental Science*, the Denlal Diploma Committee was formed consisting of Mr. Edwin Sercombe, President; Mr. James Parkinson, Treasurer, with Messrs. Samuel Lee Rymer, Joseph Steele, John Dennant, J. Haslam, W. J. Newman, John Scully, George Gregson, H. T. Kempton, and Charles James Fox; Mr. Oakley Coles, acting as Secretary. Mr. Elliot subsequently replaced Mr. Haslam who died after two years' earnest attention to the work. The result of their labours is that the Royal College of Surgeons has been pleased to grant, that those gentlemen who entered the profession prior to September, 1859, but did not present themselves for examination within four years of that time, shall now be allowed to go up for the Dental Diploma of the College, without entering upon any curriculum. The whole of the profession is thus once more placed upon a common footing, as regards the College of Surgeons, and the first and most important step has been taken towards obtaining for all duly qualified Dental Surgeons the privilege of Registration.

In our satisfaction at the result of the work of the Dental Diploma Committee, it is well that the profession should not overlook the fact that its object has been attained, in no small degree, by the personal energy and self-sacrifice of Mr. Charles James Fox, the first promoter of the scheme.

ON THE USE OF COHESIVE FOIL.

By GASCOIGNE PALMER, L.D.S.

CHELTENHAM.

Towards the close of the last paper I stated that Hele's Impactor was the only one with which you could vary the force of your blow. This is not exactly correct; I should have said of those generally sold or known to the profession, by description or otherwise. Mr. Tomes, some years back, invented a spring mallet; the blow being struck by pulling back the spring with the second finger of the right hand, the spring, on being released, driving a short piston on to the head of the plugger. In this, as in others made on the same principle, according to the distance you drew your spring back, so was the blow. But I do not think that for Cohesive Gold work, this arrangement will be found so good as Hele's Impactor; however, if anyone is in doubt, let him try the two plans.

This, however, is all by the way.

As I said in my last paper, to make a cohesive plug you must entirely depend on the cohesiveness of your gold, and, in order that there may be thorough confidence on the part of the operator of their quality, I will mention two instances of what may be done with cohesive gold, as stated in Arthur's treatise on the subject, published by Jones, White & McCurdy, of Philadelphia, in the year 1857.

He states in this work that gold can be welded when perfectly dry and annealed, and gives the two following instances.

Two sheets of number 6 foil were heated, but not to a red heat, one was laid on a wooden tray, and the other placed directly upon it. With a few taps of the finger they were united so that they could not be separated. The piece was then again heated, doubled on itself and united by the same force, until it became unmanageable in this way. Now it was doubled lengthwise, and the opposing surfaces brought together with a small hammer. When the strip became too narrow to be doubled lengthwise, it was doubled transversely and hammered together, it was then passed through a draw plate until it was reduced to a very fine wire.

2. Dr. C. O. Cone, of Baltimore, turned a piece of ivory, the size of a finger ring, this he filled with cohesive gold, in the same way as he would fill a tooth, the ivory was then cut away and a gold ring left. This was put on a goldsmith's mandril and made by hammering one-third larger.

From my own experience of cohesive gold, I believe both these tests to be true.

But it is easy for any one who feels doubtful to try them; they are not, however, necessary for the filling of teeth, and I shall, therefore, proceed with a description of the first trial I would recommend any one to make with cohesive foil.

Countersink in a piece of ivory a saucer-shaped cavity about a $\frac{1}{4}$-inch in diameter and $\frac{1}{16}$ of an inch deep in the centre, have no undercuts at all, at the bottom of the centre drill two small holes at an angle of 45°, the extremities of the holes being farthest apart, and the tops running into one another. We have now prepared a cavity into which cohesive foil is to be packed; now for the mode of procedure.

Take a leaf of No. 8 foil (extra cohesive), cut off a piece half an inch wide and double it lengthwise, cut it transversely into bits about $\frac{1}{4}$ in. wide. Now take a fine plugger with 4 sharp points, Authur's No. 8 will do very well, and taking a piece of the gold on its point, pass the gold 2 or 3 times through the flame of a spirit lamp or small Bunsen's burner, press this firmly into one of the holes and add piece by piece until you nearly gain the top; now fill the other hole in the same manner, when you reach the top bridge over the two and you will then have a thorough foundation for your plug. Now fill up your saucer shaped cavity, using the same sized pieces of gold until you begin to approach the end, and have a large surface to work on, you may then use larger pieces of gold, but it should be a golden rule never to use gold in larger pieces than the orifice of your cavity, they should be put on flat and thoroughly worked into the gold already in place, if this is done thoroughly the cavity ought to be filled level with the surface without any wedging, or working in little bits round the edges, when full, file bone and gold together to a level surface and polish, and you will have as nice a bit of inlaid gold work as you can wish. I have in this instance

purposely omitted all mention of mallet, leaving the experimentalist with cohesive gold and one instrument. I would have the experiment made in a piece of ivory because in that there is no fear of moisture and the only good that can result from it will be that the operator will find that gold can be welded, and thereby gain confidence to help him on in those cases in the mouth which I shall next treat of.

ON A NEW FORM OF PLUGGER.

By Oakley Coles, L.D.S.,R.C.S.

The form of instrument shown in the accompanying woodcut I have named, "The Crutch-headed Plugger." It is for use in plugging large shallow cavities with gold. Gold, when introduced into such cavities, is very liable to rock, from the difficulty of condensing equally at each extremity of the plug at the same time. This instrument allows pressure to be applied at the two extreme points, at the same time, and also with equal force, whilst a fine pointed instrument can be introduced between the two arms of the crutch, and the gold lying in the centre can be perfectly condensed before that which forms the extremities is released from pressure.



The instruments are burred at the top like an ordinary burr drill (but without the constriction below), so that they wedge as well as condense, the various sizes making them available for most of the cavities in which it is desirable to use them. The finish of the burr enables the operator to use the instrument at various angles without seriously reducing its efficiency.

I have placed patterns in the hands of Messrs. Ash and Sons, from whom the instruments can be obtained; and I gave a pattern to Dr. Chance, when in this country, for Messrs. S. S. White, of Philadelphia, so that I presume they can be obtained in the States by any one who may desire to try them.

It is scarcely necessary to point out that they are equally available for either soft or cohesive foil, sponge or crystal gold.

Wimpole Street, July 10th, 1874.

HOW TO WORK COHESIVE GOLD RAPIDLY AND SUCCESSFULLY.

By THOS. FLETCHER, F.C.S.

BEFORE detailing my experiments which led to perfect success and rapidity of working, I would call attention to the two following statements in the *Review* for June:—

MR. PALMER.—"One of the greatest mistakes made in the use of cohesive gold, is attempting to wedge it against the side from the centre. The effect of this is to break up your plug, and nothing in the world that I know of that can be done in the tooth will ever get these particles to re-unite."

MR. WILLIAMSON—"Now I know from experience that adhesive gold can be wedged to a considerable extent without detriment to any portion of the plug, and quite sufficient to make it as tight as a soft foil one. Those sent were so wedged and I will stand or fall by the testing of them."

Both these statements cannot by any possibility be true: Mr. Williamson proves his case practically, whilst Mr. Palmer in the May issue states that he has not made any tests and has no intention of doing so at present.

When I saw Mr. Williamson in London he said to me—"Your failure with adhesive gold is caused by your impression that it cannot be wedged, and you are wrong, I wedge it by driving points into the plug all round, and I am certain you are mistaken." He was perfectly correct; until I did begin to wedge the plugs, failures were almost invariable; and I have not made one single tight plug which has not been wedged by some means—direct or indirect. Acknowledging this as a necessity I made some pluggers with hemispherical ends, finely cut like a rose bur to pre-

vent slipping, and found that after a sound anchorage of adhesive gold had been made I could pack S. S. White's extra cohesive or any other make at the rate of rather over 1 grain per minute in ordinary cavities, the resulting plugs being invariably sound and moisture tight. These instruments both pack and wedge at the same time, and in my hands have made the difference between success and failure, they also reduce the time necessary in packing to about one-fifth. I do not wish Mr. Palmer so totally to alter his opinion as to repeat this test unless he is so disposed, but I do wish those gentlemen who sent the very large proportion of imperfect plugs to me, to test this and report their practical results in the Journals, excluding me entirely from their communication. The only conditions I observed were, to use cohesive gold exclusively, as there is risk of unsteadiness if soft foil or tin is used either as a base or mixture; to either, use the mallet from first to last, or dispense with it entirely, and to use no other pluggers than those shaped and cut like a round bur drill. No special care was taken, certainly nothing approaching what I should take in the mouth, and as a rule the surface was left rough and unfinished, so that false tests would not be obtained by burnishing and so sealing the edges.

If any plugs are sent to me to test it must be on the condition that the state of the plug after testing, the name of the operator, and the fullest details as to instruments, system of working, and conditions observed, are published by me. I very much regret that this condition was not made at first, although it would no doubt have made a serious difference in the number received, operators being excessively chary as to their failures being made public, more especially when, as was the case, many of the worst failures were by those who made the use of adhesive gold almost their whole daily work, including more than one of the professors of American colleges. If it had been done it would have relieved me of a considerable amount of annoyance, as some of the writers on the question have apparently an impression that as they were perfectly satisfied with their own work the question ought not to have been raised. Allowing that we are so near perfection as to be pleased with ourselves, it is good that the weak side shall be occasionally overhauled and improved. People do not like as a rule publicly to acknowledge their failures,

but some few have done so in the Journals. If they can succeed now with the means of working and testing at their disposal, I shall be content to take the credit of it as a return for the blame I have received up to the present time. Let it be borne in mind by those who write, that this question was raised by me at least four months before the first sound plug was received, that the third, fourth and fifth were made by myself, and that all I have received since would not amount to the number of unsound plugs received on one single day. It is a state of things which ought not to exist: whatever criticisms on myself are published, the fact cannot be smoothed over, and I was perfectly justified in thoroughly raising the question in such a manner as to compel attention to it. I did this as an unpleasant but necessary duty, reporting results fairly on all sides; the unpleasantness still remains, and of the very few operators who have up to the present succeeded in doing sound work, not one has taken the trouble to clearly report the details and means by which he succeeded.

ON THE

MICROSCOPICAL STRUCTURE OF FOSSIL TEETH,

FROM THE NORTHUMBERLAND TRUE COAL MEASURES.

By W. J. BARKAS, M.R.C.S.E., L.R.C.P., London.

[*Continued from p.* 11.]

PŒCILODUS.

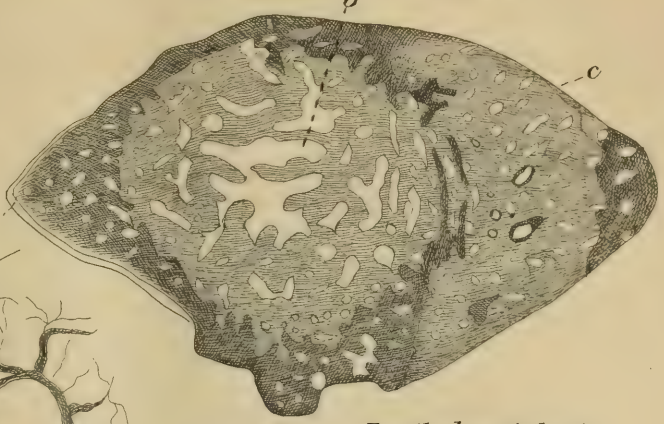
This genus is another example of the Cestraciont family that is known only by its teeth, and is usually considered as one of the group of Psammodonts, but it differs from the other teeth of that group in having its upper or crushing surface strongly ridged. Though it possesses this difference I am of opinion that it is truly a Psammodont, because, under the microscope, it presents a minute structure, closely resembling the structure of the other teeth of that group, and because its external form is vertically compressed as in Psammodus. This genus is comparatively rare both in the True Coal Measures and in the Subcarboniferous Limestone, and has not as yet been obtained in any other formation. Only

Fig XL



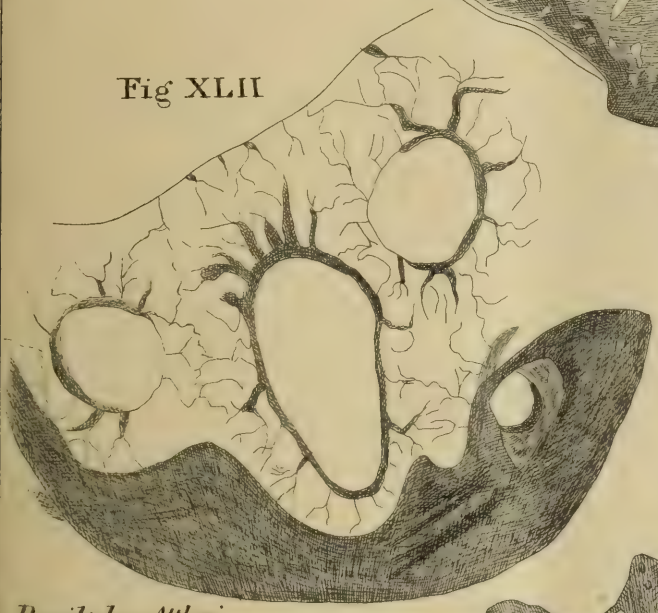
Pœcilodus Attheyi
Nat. Size.

Fig XLI



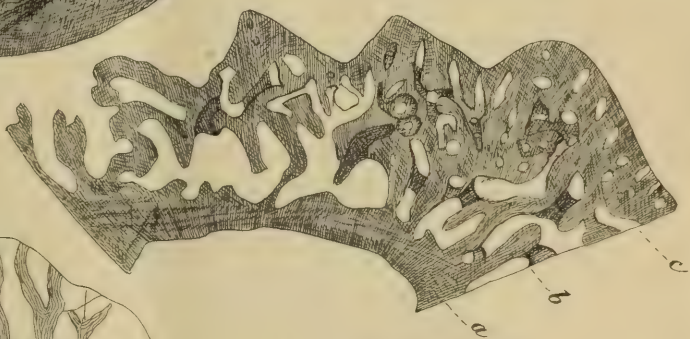
Pœcilodus Attheyi.
Transverse Section.
Magnified 20 Diameters.

Fig XLII



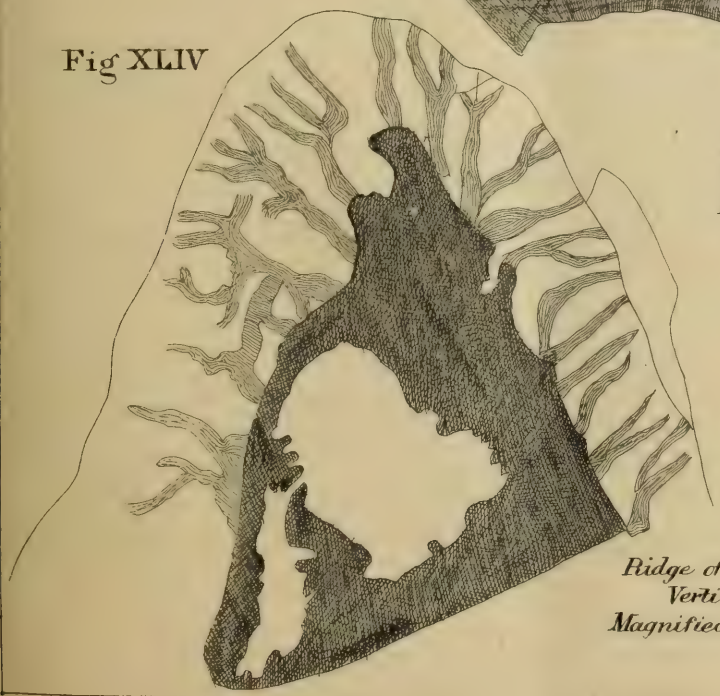
Pœcilodus Attheyi.
Transverse Section.
Magnified 140 Diameters.

Fig XLIII



Pœcilodus Attheyi.
Vertical Section.
Magnified 20 Diameters.

Fig XLIV



Ridge of Pœcilodus Attheyi.
Vertical Section.
Magnified 250 Diameters.

T. Bessent, lith, 29 Essex St, Strand.

one species has been discovered in the Coal Measures and although it has been known now for some years it has never been thoroughly described. In Barkas' "Coal Measure Palæontology" however, it has been excellently figured, but his description is very short, merely referring to his illustrations. The limestone varieties are comparatively numerous, twelve having been named, most of them being figured and described by McCoy, Newberry, Werthen and Portlock; they are all much larger than the species from the first-named formation but whether they are all distinct varieties is open to much doubt, for some of them differ from each other very slightly, P. Jonesii and P. transversus for example, others possess characters more allied to Cochliodus. In the "British Palæozoic Fossils," McCoy states his belief that Pœcilodus is merely a variety or subgenus of Cochliodus (a limestone tooth) this may certainly be the case with some of the specimens he describes and names Pœcilodus, but, if one can judge from his engravings, I very much doubt their being Pœcilodus at all, for their resemblance to P. Jonesii (a typical Pœcilodus) is very remote indeed while they do present many of the characters of the Cochliodus. That these two genera do possess certain characters in common, both externally and internally, is undoubtedly true, for they are both Psammodonts, but a typical Pœcilodus differs as as much from Cochliodus as does Psammodus.

The variety from the True Coal Measures is very small, yet it undoubtedly belongs to the genus under consideration, for it possesses several characters in common with P. Jonesii from the Subcarboniferous Limestone of Armagh, but it differs from that species and the other eleven named varieties in some important particulars, I have, therefore, in order to distinguish it from the others, named it P. Attheyi after the gentleman who was probably the first to discover it.

Pœcilodus Attheyi is, as I have said, very small and varies very little in size in the different specimens, Fig. XL., being one of the largest in my possession, it is oval in form and compressed from above downwards, it measures one quarter of an inch in its long axis and three-twentieths of an inch in its short axis, the smallest specimens being about one-third less in each direction. In some cases the teeth are not regularly oval, but are egg-

shaped, one extremity being broader than the other. The tooth has two surfaces, a superior and an inferior, the former being convex in all directions, and the latter concave, thus resembling the tooth of Pleurodus, but unlike that tooth, it does not possess any lateral prolongations, the margins being uniform; in some of the limestone varieties, however, the sides are prolonged, but they differ from the prolongations of Pleurodus in being curved downwards and inwards, as in Cochliodus. The superior surface is marked with comparatively broad horizontal ridges running in a direction nearly parallel to the short axis of the tooth, they are slightly wavy in their course, and where the wave is most acute they become rather raised forming a kind of tip, these tips, being all of nearly uniform height and almost on a line with each other, form a ridge along the long axis of the tooth which is situated nearer one margin than the other, and it runs parallel to that margin; this surface is generally minutely pitted, the porous aspect being most noticeable in those specimens that have been much worn during life. The inferior surface is smooth. The margin of the tooth is notched, the notches corresponding to the depressions between the ridges on the superior surface. Nothing is as yet known as to the arrangement of these teeth on the jaw but they were in all probability arranged like the teeth of Pleurodus, as shown in Fig. XXX.; should this be the case, the ridges on the superior surface would run anteroposteriorly. The minute structure of Pœcilodus resembles that of Pleurodus, Helodus, &c., to a certain extent; it is composed solely of vascular dentine, having a layer of enamel overlying its upper surface. The vascular dentine appears to consist of three distinct varieties, which are not, however, so distinctly separated from each other, as in Pleurodus, but they are observable in the vertical section shown in Fig. XLIII., and they are arranged one above the other, thus we have an inferior, an intermediate, and a superior layer, which are distinguished in the figure by the letters *a*, *b* and *c* respectively. The inferior layer (*a*) is unvascular, no canals penetrating it, nor yet are there any calcigerous tubules, at least, I have not been able to detect any in the numerous specimens I have examined, the tissue is homogeneous,and is arranged in layers, each layer being superimposed above the other,

they are not regularly concentric but have a general tendency to be parallel to the inferior surface. The intermediate structure (*b*) is exceedingly vascular, the canals being in decidedly greater proportion than the dentinal tissue, they are very large, some measuring as much as one one-hundredth of an inch in diameter; they branch very freely, the branches anastomosing almost immediately with the neighbouring canals, these branches are also very large being almost equal in diameter to the main canals, the course of the vascular canals in this part is consequently indistinct; the transverse section, Fig. XLI., exhibits this structure very clearly; in this figure only the intermediate and superior structures are to be observed, for the section was made through the centre of the body of the tooth. The superior or external layer shows a great preponderance of tissue over canals the reverse of what we observed in the layer immediately below it, the canals are continuous with those of the intermediate structure, but are much smaller in diameter and branch less frequently, the branches are given off at an acute angle to the main trunk and proceed on their way to the periphery parallel to it; the whole tendency of the canals and their branches in this part is to run parallel to the vertical axis of the tooth, the branches rarely anastomose, only two or three inosculations being visible in the vertical section (Fig. XLIII), and none at all in the transverse (Fig. XLI.); the canals terminate abruptly and in two distinct modes, in the most frequent method they end before reaching the periphery and are closed in by unvascular dentine and enamel as is exhibited in Fig. XLIV., in the other mode they terminate at the surface and are covered only by the coat of enamel; but in teeth that have been much worn these canals are quite patent, and the pitted appearance observed in these specimens is due to this cause. From all the canals arise calcigerous tubules, those permeating the superior layer of the vascular dentine giving them off most prolifically. The tubules vary in their diameter, those ramifying in the intermediate layer being smallest, averaging about one three-thousandth of an inch, while those near the periphery of the tooth measure frequently one two-thousandth of an inch; the diameter of the tubules in both structures, it will be observed, are comparatively great but they pursue a very short course, and

give off few branches, these branches almost invariably arising at the extremity of the tubule, amethod of branching that is decidedly not dichotomous, nor yet can such a tubule be called dendritic, for it does not give them a tree-like appearance; the branches given off by the tubules in the body of the tooth anastomose directly with the branches from tubules springing from the same canal and from the neighbouring systems (Fig. XLII.), the branches are comparatively large, for in the above section they can be seen very clearly, though they have only been magnified one-hundred-and-forty diameters, a higher power does not bring any more into view, but shows their inosculations more clearly; the tubules, and more especially the branches, are wavy in their course. Fig. XLIV. represents a vertical section of one of the ridges magnified two-hundred-and-fifty diameters, and it shows the termination of one of the vascular canals with the dentinal tissue surrounding it and the tubules springing from the canal and ramifying in the tissue; these tubules are, as I have said, larger than those in the body of the tooth, their course is straighter, they branch less frequently and the peculiar method of branching is more clearly shown, the branches are very large, do not appear to anastomose but pursue their course direct to the superficies and are closed in by the layer of enamel only, as we observed to be the case with some of the vascular canals. The dentinal tissue is perfectly homogeneous and without any trace of lamination around the canals. It will not, I think, be out of place, while we are describing the minute structure of this tooth, to warn all commencing enquirers into this branch of palæontology against the common error of drawing deductions without a sufficiency of evidence; for example, Agassiz in describing Ctenoptychius denticulatus, stated the tissue of the vascular dentine was tubuleless, but I showed in my paper on that tooth it was not so, and that I could cause my sections to be tubuleless or otherwise by varying the thickness, very thin sections presenting a perfectly homogeneous and tubuleless structure, while in the thicker sections calcigeous tubules were always found to be present. The same error is liable to be made with regard to Pœcilodus Attheyi, and for some time I thought the tooth did not possess tubules, but all my latest sections, prepared under my own supervision, clearly demonstrate

the existence of comparatively large and numerous tubules. Fig. XLI. when examined under a higher power shows them, but only in certain parts, for the section varies in thickness from being very thin and transparent to being thick almost to opacity; in the thin places the tubules have been completely ground away and the thick portions are rendered somewhat opaque by the number of tubules, the intermediate portions present every variation between these two characters, being in some places tubuleless but retaining the depressions which the tubules have left when broken away.

The layer of enamel covers the whole of the superior surface of the tooth, it averages about one one-thousandth of an inch in thickness, it is very brittle, so that it is difficult to retain it in making a section; Fig. XLIV., however, shows a portion of it. I have not been able to detect any tubular structure in this enamel even under a power of 600 diameters, but in some places it has a distinctly granular appearance, which I am inclined to think is caused by the infiltration of carboniferous matter from the vascular dentine; I cannot prove this, but it is exceedingly probable because nearly every specimen of fish enamel that has as yet been examined, has been shown to be tubular.

At the conclusion of my paper on Pleurodus I remarked that a similar transverse section of Pœcilodus and of Pleurodus under a power of twenty diameters could not be distinguished from each other, and that therefore it was not necessary to give an illustration of this view of Pleurodus. Fig. XLI. would answer perfectly well for a section of Pleurodus were it not that on the inferior margin we observe portions of two or three ridges. Though these sections present such a similarity under a low power, under a high power they possess distinctly different characters.

CORRELLATION OF GROWTH BETWEEN THE TEETH AND THE HAIR.

By DAVID HEPBURN.

Paper read before the Middlesex Hospital Medical Society, June 24, 1874.

Mr. President and Gentlemen,—I wish to bring before your notice this evening one or two cases in which an abnormal development of the hair has been associated with a corresponding abnormality in the teeth. Before doing so however, with your permission, I will briefly compare those points in the growth and structure of these two parts of the human organism in which similarity exists.

The teeth and hair are of course mere dermal appendages, even the tooth, although the hardest substance in the body, containing as it does such a large proportion of calcareous matter, being quite distinct from the skeleton.

Thus then we have one point of similarity, namely that they are both outgrowths of the skin, that is to say, they are both formed from cells similar to and derived from the cells forming the cutis and the cutis vera, these cells becoming modified in their several cases to fulfil their required ends, in the teeth becoming excessively hard and calcareous for purposes of mastication, and in the hair remaining softer for purposes of warmth and protection. Again, in their mode of development they much resemble one another, indeed in the very early stage are almost identical. At the bottom of the hair follicle we find a small papilla of the cutis vera, from which the cells necessary for the formation and maintenance of the hair are derived, while in the case of the tooth a corresponding condition exists, merely with this difference, that the tooth papilla goes to form the dentine alone, the enamel or external covering of the tooth being formed from the growing cells of the epidermis.

Passing to the lower animals we find a stronger bond of union between these two structures, for we here find the epidermis in some cases modified into bony plates, whereby the animal is encased as it were in a suit of armour. Of this we have a well known example in the armadillo, whose osseous plates seem to be a connecting link between the teeth and the hair.

In the human subject the hair is constantly growing,

while the teeth having once assumed a certain size and length do not increase. This however is due to the conical form of the fang, which tends to shut off the pulp or active part of the tooth from its blood and nerve supply, communication being kept up through a very minute foramen at the apex of the fang. In teeth however, whose roots are not conical, but are of equal size throughout, continual growth takes place. This is well exemplified in the incisor teeth of the Rodents, which are constantly being worn away by the gnawing habits of the animal, and yet continual growth takes place to make up for the incessant loss. Again in the case of the hair, when one hair is thrown off another comes up to take its place; the parallel to this we also find in the lower animals, for example, in the crocodile, who is constantly shedding its teeth, which are invariably replaced by new ones, and thus a constant change goes on which continues throughout the whole life of the animal. This correllation of growth, to which Mr. Darwin has alluded, may be noticed in the domestication of animals. Take for instance the common pig, in its wild state it is covered with bristly hairs and armed with formidable tusks, when domesticated its hair decreases in strength and quantity, and its tusks generally diminish in size. Allow the animal however to return to its wild state and the teeth and hair will soon assume their original characters.

From these few remarks then we see that many points of resemblance exist between the capillary and dental portions of the animal body in its normal state. It is not then surprizing, that an abnormal condition affecting one part of the organism, should also influence another part of the same organism, the parts themselves being so intimately associated. This indeed is what we find to be the case, for in all the known examples of hairy or hirsute men, abnormal conditions of the teeth have always accompanied the abnormal development of the hair. In illustration I will run through three striking examples, one of which I have examined and verified for myself.

Towards the commencement of the present century was born in the domain of the king of Burma a man, whose whole body with the exception of his feet and hands was covered with hair. In the upper jaw he had four incisors, all the other teeth being absent, and in the lower jaw only four incisors and one canine. The

result of his marriage, which was brought about by bribery, was a daughter who presented the same peculiarities as her father, the distribution of the hair being the same, and the molar bicuspid and canine teeth being absent. In course of time she got married and had one son, who it is said was also hairy and deficient in teeth. In this family the superabundance of hair did not manifest itself until after puberty.

The next case is that of Julia Pastrana, a woman who was exhibited in London some 25 years ago, a model of whose mouth I now exhibit. She was I believe commonly known as the pig-faced lady, a protrusion of the jaws giving to the face an appearance somewhat resembling that of a pig. What however, at present most interests us is the fact that the lower part of the face and chin was covered with a marked beard, while at the same time the teeth presented striking peculiarities. Mr. Darwin I believe has described her as having a superabundance of teeth, but from the model which I have here, exactly the reverse condition seems to be the case. The model shows that she must have suffered from hypertrophy of the gums, which condition probably gave rise to the pig-like aspect of the face, and it is quite possible that with this state of the gums the teeth may have been extracted or imbedded and concealed from view. At any rate the teeth are sufficiently abnormal, even if we only take into consideration their shape, to warrant our quoting the case as an example of the condition which we wish to illustrate.

The last case which I wish to bring before you is that of the "Kostroma People," who were exhibited in London a few months ago. By the kindness of Mr. Oakley Coles I am enabled to show you photographs and models of the mouths of these curious individuals.

It appears that a man whose age, at present, seems to be about 50, was born in a small Russian village, he suffered from an excessive growth of hair on the face and neck, which exposed him to insult and cruel treatment from his fellow villagers. To escape this he fled and lived in a cave. Notwithstanding his unprepossessing appearance he managed to get married, and a little boy his only surviving child is exhibited along with him. Adrian, the father, possesses in the upper jaw only one tooth, described by Virchow as a canine, but considered by Mr. Tomes and

Mr. Oakley Coles to be a lateral incisor. In the lower jaw he has the remains of four incisor teeth. The little boy whose face is covered over with fine silky hair, almost white in colour, but of considerable length, in the upper jaw, is quite edentulous, but on passing the finger over the gum I found it tough and horny. In the lower jaw he has only the four incisors present.

In explanation of these peculiarities of dentition which seem to be common to all hirsute people, no satisfactory explanation seems to have been offered. Virchow believes that it depends upon peculiarities of innervation depending upon accidental or congenital abnormalities in the trigeminus, but adds that this can only be proved by careful dissection. At first sight it would appear that an excess of growth in the hair produced a corresponding deficiency in the number of teeth, but if it be correct, that Julia Pastrana possessed a superabundance of teeth, this idea does not hold good. Moreover, it is stated by Mr. Tomes, quoting from Darwin, that a certain breed of dogs found in Turkey, whose bodies are almost totally devoid of hair, are also deficient in a great number of their teeth. These facts, gentlemen, being of some interest, I have made them the subject of my short paper, in the hope that I may learn something more respecting them, from the members of this society

ON MECHANICAL APPLIANCES FOR THE TREATMENT OF FRACTURES OF THE JAWS.

(Guy's Hospital Report.)

By HENRY MOON, M.R.C.S., L.D.S.

ASSISTANT DENTAL SURGEON TO GUY'S HOSPITAL AND TO THE LONDON DENTAL HOSPITAL.

One advantage of using a metal splint for the fracture is, that when union has taken place, the vulcanite wedges or other retaining apparatus may be dispensed with, and the metal cap be kept in place for a few weeks longer by the means next to be described. This second plan of fixing requires that holes should be drilled in the metal splint before it is put into the mouth. These holes, or rather slits, are made at the level of the necks of

the teeth that are to be used as fixing points,—one on either side of a tooth at the buccal surface, and two opposite to these on the lingual surface of the cap; the term buccal and not labial is used, as it is only from the canine backwards that we are sure of finding the triangular space between the necks of the teeth large enough for our purpose, which is the encircling the tooth, together with the portions of plate at its front and back, with a strong piece of binding wire. The slits should be drilled with care, their outer ends being opposite the triangular space between the teeth and the end which approaches the other slit being smoothly bevelled, that the wire, when twisted up tight, may escape being cut. This plan comes in very well to secure the splint in severe cases after union has been obtained, and I doubt not, will answer well as the sole means of fixing from the commencement of treatment, in cases where the tendency to displacement is not great, for instance, in single fractures occurring near the symphysis, one or more teeth may be encircled with wire at each end of the splint. The advantage of this method over the plan of wiring together teeth adjacent to the fracture is obvious, as it does not cause irritation of the gum or tend to loosen or displace the teeth. A plan has been adopted of fixing the metal cap by means of strong wires soldered to each end of the cap, and bent so as to come out at each side of the mouth, and be curved down and imbedded in a gutta-percha splint moulded to the chin; but where the tendency to displacement is inconsiderable, the wiring-in of the splint seems simpler, and, where it is considerable, I should distrust the curved wires so fixed;—they certainly could not be made to exercise the pressure sometimes necessary at the back of the mouth. For the treatment of severe cases, the Lonsdale apparatus, as improved by Mr. Berkeley Hill (figured in Bryant's 'Surgery,' and in Heath's 'Essay'), no doubt satisfactorily fulfils its object, but the apparatus which was devised by Mr. Millikin, at my suggestion, possesses, I think, some advantages. It is readily adapted to a jaw of any size, will exert any amount of pressure over the back teeth, leaves the front of the mouth free for feeding, &c., and, being introduced separately from the cap, it is easily applied, and can be readily removed when desired without shifting the plate, which latter can be left *in situ*—fastened

in with wire, as described above. I have also found it very useful in the final adjustment of the fracture beneath the cap, by the graduated pressure of the screw, first exerted on the one side and then on the other.

I will now give a short report of two cases of fracture, not chosen as specimens of successful treatment, but because they presented difficulties which will serve to illustrate well the methods of setting advanced in this paper.

The first is that of a man, æt. 28, of weakly appearance, who was admitted last July into Guy's, under the care of Mr. Birkett. He was brought insensible into the hospital with a scalp wound, and his lower jaw fractured on both sides. Patient *said* he had been knocked down and fallen on kerbstone. The right side of the jaw was fractured in front of the second molar, the posterior fragment being three quarters of an inch higher than the front of the jaw, which was drawn down so strongly by the muscles attached to the hyoid bone, that great force was required to bring the lower incisor teeth to anything like their proper level. On the left side a fracture was found in front of the first bicuspid. At Mr. Birkett's request, I fitted a splint to the jaw, including in it the two fractures mentioned, but unfortunately failed to recognise a third fracture, which was present in front of the second molar of the left side, or the splint would, of course, have been made to pass beyond it. The splint was put on under chloroform, and fixed in place with the apparatus. The behaviour of the three fractures was instructive, the two included in the splint uniting without suppuration, while the union of the third was attended with suppuration and some displacement. The fractures all occurred at points where teeth had been previously lost, and one of the chief difficulties in making an accurate splint for the case was the absence of teeth, only three remaining in the upper jaw to serve as guides. After the lapse of four weeks, while attaching the splint with wires to the second right molar and the first left bicuspid, I discovered the third fracture, but concluded it would not be well to disturb it then, and the ill effects of the resulting displacement, as regards the bite, was rectified afterwards by filing the two teeth which came unduly in contact—an operation, which may be fairly had recourse to, if the filed surfaces are exposed to friction.

Case 2 was that of a man, æt. 20, who, in July last, was

admitted into Job Ward, under Mr. Bryant's care. He had received on the left side of his face a blow which had fractured his lower jaw, just in front of the ascending ramus, between the second molar and wisdom tooth. This patient had square, strongly-developed jaws; his set of teeth was perfect, but the front ones were much worn down by an "edge bite," while his back ones had not attained the usual height above the gum—a condition which would have precluded the wiring together of the teeth, which plan of treatment was also rendered impossible by the fact that the lower left wisdom tooth, which was the sole occupant of the posterior fragment, was not fully erupted, its distal and buccal surfaces being covered in by gum. The posterior fragment of the jaw was drawn most forcibly outwards and upwards; the masticatory surface of the wisdom tooth being more than half an inch higher than the other teeth. The main body of the bone, having all the muscles, including the mylo-hyoideus, exerting unchecked traction towards the hyoid bone, was drawn very forcibly inwards and downwards. There was great external deformity, and the patient suffered much pain, which prevented sleep. On admission, there was considerable hæmorrhage from the wound in the mouth, and much swelling of the parts around. Mr. Bryant requested me to set the fracture; the difficulty lay in the very slight purchase obtainable on the posterior fragment. A metal cap (made of dental alloy) was placed on the lower teeth, and, in order to gain purchase, it was extended as far forward as the central incisors. The upper surface was rendered very strong and quite unbendable, by soldering on a plate of metal, which extended over the masticatory surface of the wisdom tooth. The splint capped in as much of the lingual surface of this tooth as was above the gum, and a narrow rim was turned down over the buccal and distal edges. The splint was kept in place by a vulcanite wedge, which capped the upper teeth from the canine backwards, the vulcanite being also made to fill the place of the upper wisdom tooth, which had not been erupted. A strong four-tailed bandage was applied.

Another method of setting fractured jaws, which Mr. G. E. Hammond says was adopted by him with great success during the Franco-German war and Siege of Paris, seems likely to be very useful. The following description of the

plan is derived from the last May number of the 'Monthly Review of Dental Surgery.' A frame of strong iron wire is adapted to the fractured jaw; it is bent round, so as to encircle in one loop all or any desired number of the teeth at the level of their necks. The ends of the wire are soldered together, and the finer adjustments are given to the frame with a pair of small curved pliers. This collar is slipped over the teeth, and is tied in place by short pieces of thin binding wire passed round *each* tooth, and interlaced with the frame. The two ends of each of the binding wires are twisted together in front until nearly tight, and are afterwards twisted quite tight, a loop on each side alternately being tightened up, so that even pressure may be exerted. The ends of wire are then cut off, and the remaining twisted ends are tucked in between the teeth. A spirit wash is used for rinsing the mouth. The frame should be worn for six weeks, during which time the patient should confine himself to soft food. A case was lately quite successfully treated in this manner, in the surgery at Guy's, by Mr. Golding Bird. The patient, a man æ. 26, had his lower jaw fractured at the symphysis by a blow of the fist. The tendency to displacement was not great. Two weeks after the injury the wire splint was applied, and good union was obtained in six weeks. Mr. Hammond claims for the splint superiority over all others, but it is not applicable in all cases. For instance, in the above-related case of Mr. Bryant's patient, it could not have been applied.

To meet other special cases, modifications of the capping treatment may be used. Thus, in a case where a fracture occurs at the back of the mouth, where no teeth are standing, a vulcanite cap may be fitted to the upper teeth, having its lower surface, which would come in contact with the fractured under jaw, coated with gutta percha. Or two vulcanite caps may be made so that their plain surfaces may meet equidistant from the gums; a four-tailed or a Hamilton's bandage being used, of course, in all such cases.

THIRTEENTH ANNUAL MEETING OF THE CENTRAL SOCIETY OF GERMAN DENTISTS.

(To be held on the 3rd 4th and 5th of August, 1874, at Cassel.)

PROGRAMME.

The opening will take place in the rooms of the Reading Museum, on Monday, the 3rd of August, at 9 o'clock, a.m.

PROPOSITIONS FOR DISCUSSION.

(1) The use of nitrous oxide as an anæsthetic.

(2) In what manner can teeth where the pulp is dead be best preserved?

(3) What treatment for Blennorrhœa of the socket has proved most favourable in its results?

(4) What experience has been gained lately in the treatment of inflamation of the dental periosteum?

(5) Whether sharp stumps of teeth which injure the tongue, can give rise to cancer in that organ?

(6) How can the polished surface of a tooth be anatomically explained?

(7) Whether Dr. Arthur's system for the treatment of and preservation from caries has been in use amongst us, and with what result?

(8) Whether a magnifying glass, recommended by Taft for excavating and stopping has been used?

(9) Is thick gold foil to be preferred for the purpose of stopping, and in what cases?

(10) What results have occurred in the use of the newest preparations of gold?

(11) What are the results arising from the use of Guillois' cement?

(12) How have burring engines been found to answer?

(13) Whether the use of cofferdam deserves further trial?

(14) Whether the revival of aluminum dentures, according to Sauer's method, is to be approved of?

(15) What stumps can, or should be preserved in making a complete set of teeth?

(16) Practical communications:

(*a.*) Upon particular accidents in extraction.

(*b.*) Upon rare abnormalities.

(*c.*) Rare pathological occurrences in the jaw and gum.

(*d.*) Irregularities, and regulation of the teeth.

(17) The question of education.

The following Lectures have been announced up to the present time:—

(1) Grohnwald, on nitrous oxide.

(2) Steinberger, on deformities of the jaw, and on the arrangement of irregularly placed teeth.

(3) Schlenker, on the artificial production of caries.

(4) Langsdorff, the conditions of temperament as the basis of a new physiological law.

(5) Witzel, on the practical treatment of exposed and inflamed pulp.

(6) Discussion upon new forceps for the extraction of lower molars.

(7) Microscopical demonstrations of different preparations.

We beg those gentlemen who wish to open questions of importance in the general assembly, and also those who think of giving addresses, to send communications referring to the same to the president of the central association.

We further beg our colleagues in the general interest, to collect as far as possible material referring to the above questions, in order that the problems that the central association have selected for solution this year at the general meeting, may be successfully solved.

The Divisional Presidents of the C.V.D.Z.

Dr. Klare, of Leipzig.

Dr. W. Suerson, of Berlin.

Dr. Steinberger, of Vienna.

Feodor Grissler, of Chemnitz.

THE DENTAL DIPLOMA QUESTION.

PETITION TO THE ROYAL COLLEGE OF SURGEONS.

To the Editor of the Monthly Review of Dental Surgery.

DEAR SIR,—I have much pleasure in forwarding to you for publication the following Petition to the Royal College of Surgeons of England, with the gratifying announcement that, after deliberate consideration, and on the recommendations of the Dental Board of Examiners, the Council of the College have, with their usual enlightenment, acceded to the prayer of the petitioners.

I am, dear Sir,
Yours faithfully,
EDWIN SERCOMBE,
Chairman of the Dental Diploma Committee.

TO THE PRESIDENT AND COUNCIL OF THE ROYAL COLLEGE OF SURGEONS OF ENGLAND.

This Petition of the undersigned Dentists of Great Britain and Ireland, SHOWETH,—

That by the Charter granted to the Royal College of Surgeons of England, by Her Majesty Queen Victoria in the twenty-third year of her reign, upon the 8th of September, 1859, power was granted to the said College to institute and hold examinations for the purpose of testing the fitness of persons to practise as Dentists who may be desirous of being so examined, and to grant certificates of such fitness. That your Honourable Council, in fulfilment of these powers, did thereupon institute a Board of Examiners in Dental Surgery, by whom a Diploma in Dental Surgery was granted upon examination to certain practitioners in Dental Surgery who applied for the same prior to September 8th, 1863, provided their professional education had commenced prior to September 8th, 1859, and subject to certain other restrictions; and that out of over 1500 practitioners of Dental Surgery of all classes practising at that time only 272 availed themselves of this permission up to September 8th, 1863, for reasons which shall be hereinafter shown.

That by a resolution in Council of your Honorable Corporation no candidates were admitted for examination

after September 8th, 1863, unless they had passed through the curriculum of study provided by your Honorable Council.

That from September 8th, 1863, to 1873, out of the increasingly large numbers of practitioners in Dental Surgery only 69 candidates were examined for the Diploma in Dental Surgery, after complying with the curriculum ordered by your Honorable Council; of this number 61 obtained the grant of the Diploma, viz., two in 1864, two in 1865, nine in 1866, four in 1867, three in 1868, six in 1869, eight in 1870, six in 1871, five in 1872, sixteen in 1873, four others having obtained the Diploma since September 8th, 1863, without passing through the curriculum, having applied for it prior to September, 1863.

Your Petitioners submit that the fact that out of over 2000 practitioners of Dental Surgery of all classes who have since 1863 been in practice up to the present time, only 73 have hitherto deemed it advisable to seek the honour of your Dental Diploma, is an indication that a measure which was designed by your Council to assist in the elevation and improvement of Dental Surgery has not succeeded so far in effecting that object as there was reason to expect; and your Petitioners desire to submit to your consideration what to them appears to be the reason of this non-success, and to solicit at your hands such measures as they trust will tend to effect that improvement which they are assured your Honorable Council really desire to see brought about.

Your Petitioners submit that when the Charter of September 8th, 1859 was granted, Dental Practitioners were divided into two parties, one seeking to establish an independent College of Dentists, the other seeking union with the great body medical through the medium of your ancient Corporation. These two parties included in their list, with a few of the chief provincial practitioners,, nearly every metropolitan name of note, gentlemen who were supposed to be best informed upon all matters relating to the welfare of the profession; the rest had not the same opportunities of coming to a right conclusion, and could only see that their leaders were divided among themselves, each party by its respective journal, addresses, and circulars, urging their provincial brethren to adopt its own special plan, and throwing doubt upon the position advocated by the opposing party. This being the case, the majority

stood aloof, remembering that this was not the first time that similar efforts had been made and failed to bring about union among Dental Practitioners. When, happily, the two opposing parties became united in 1863, those who had opportunities of intercourse with metropolitan practitioners, and were rightly informed as to the true state of affairs, hastened to submit themselves to examination by your Honorable Board, but there still remained a large number who, guided often by the counsel of their medical friends in the country and the tone of the medical press, which, at that time, in many ways undervalued and depreciated the new Dental Diploma, still held aloof.

Your Petitioners have thus endeavoured to show how it was that comparatively so few availed themselves of the privilege accorded to them by your Honorable Board of submitting themselves to examination without previously passing through the curriculum; but as time went on the real value of the Dental Diploma became appreciated, its stability was proved, and many gentlemen would have applied for examination but for the passing of the above mentioned resolution in Council which prohibited such examinations without curriculum after the year 1863.

Your Petitioners respectfully submit that the passing of this resolution acted prejudicially, not only upon those already in practice, who were thus for ever precluded from amending an error for which they could not altogether be considered accountable, but it also acted with regard to those who had already obtained the Diploma, as it left them in so small a minority that the public failed to see the value of a Diploma which, in many provincial towns, was often held by a young and comparatively inexperienced practitioner, and not by some highly respected gentleman, long known and valued for his skill and experience.

Your Petitioners further submit that this said restrictive resolution has been found to act injuriously upon the Dental Profession, in so far that it rendered too few personally interested in the Dental Diploma to ensure a large supply of pupils willing to pass through the curriculum at the Dental Schools. This is evidenced by the small number of those who have passed through it in the last ten years—being only an average of Seven in a year.

Your Petitioners submit that if a larger number of those

practitioners whose education commenced prior to 1859 held the Diploma in Dental Surgery, more of them would urge their sons and pupils to enter upon the course of study required for the Dental Diploma; and the advantages gained by those educated under the curriculum are so great that it becomes a duty to adopt such measures as will tend to bring into general use a course of study which has hitherto been exceptional.

Your Petitioners submit that the present system of Dental quackery and puffing can only be ultimately reduced by the extension of education and by the increase of that mental refinement which arises from thorough professional training, and they conceive that by seeking to increase the number of elder holders of the Diploma, who would encourage the rising generation to work for it, they are thereby consulting the best interests of those who already hold it, whether they be those who availed themselves of the years of grace or those who have obtained it after passing through the required curriculum.

Your Petitioners therefore humbly pray that your Honorable Council will restore the Dental Profession to the position it held in relation to the Royal College of Surgeons in 1863, by permitting all those whose Dental education commenced prior to September, 1859, to present themselves for examination without requiring them to pass through the curriculum, but *not* without subjecting them to a fair yet searching examination.

Your Petitioners are far from advocating the wholesale admission of uneducated, ignorant, unobserving men, but your Petitioners have reason to know that there are many gentlemen of excellent practice in the provinces, colonies, and elsewhere, who would spare no expense, no time, in the acquirement of knowledge by private reading and study, if by such means they could be admitted as Candidates for the Dental Diploma. But however highly they value that Diploma, they cannot afford, at their age, to throw up a practice which is, perhaps, the work of years, and enter the ranks of the students in London.

Your Petitioners, therefore, respectfully request that your Honorable Council will pass a resolution rescinding the restrictive one, and admitting for examination, without curriculum, all those whose professional education commenced prior to September, 1859, *at any time of their life*,

as it is contrary to all precedent that any such measure as the Dental Act or Charter of 1859 should ever affect any one who was in professional existence prior to the passing of such Act.

Your Petitioners further beg respectfully to submit that whilst they seek to place the profession in the same relation to the Royal College of Surgeons of England that it held in the year 1863, with regard to those whose professional education commenced prior to September, 1859, and therefore desire to see the regulations made at that time with reference to those who combine the practice of Dental Surgery with some trade, or who habitually practise the unprofessional habit of advertising, your Petitioners would further entreat that your Honorable Council would add such regulations as will enable you to strike off the list of your Dental Licentiates any one who, after obtaining your Honorable Diploma on the representation that he does not advertise, shall subsequently resort to the practice, to the destruction of all honorable and brotherly professional feeling.

Your Petitioners beg respectfully to submit that, by extending the desired act of grace to the elder practitioners, and thereby increasing the encouragement that will be given to the rising generation to seek the Dental Diploma, the number of Dental Practitioners who will ultimately seek the higher honours of the Membership and Fellowship of the Royal College of Surgeons of England without relinquishing their speciality will be largely increased, since it has been proved by experience that many young men who have commenced their studies for the Dental Diploma with the fixed determination to proceed no further, have, by association with their fellow medical students, become so incited to the pursuit of increased medical knowledge that they have ultimately obtained the higher Diplomas, and by their attainments have reflected increased honour on the speciality they follow.

Trusting that your Honorable Council will give full and kindly consideration to the prayer of this Petition,

Your Petitioners will ever pray, &c.

(Signed)

ALDER, CHARLES, 33, Rodney-street, Liverpool.
ASHBY, RICHARD, Argyle-street, Regent-street.
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BARRETT, HENRY J., M.R.C.S., L.D.S., 42, Finsbury-square ; late President of the Odontological Society ; late Dental Surgeon to the London Hospital ; Lecturer on Anatomy and Diseases of the Teeth, London Hospital Medical and Surgical College.
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BROOKHOUSE, R., L.D.S., Manchester ; Dental Surgeon to Asylum for the Blind, &c.
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HEATH, T. W., The Green, Richmond.

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HENRY GEORGE, L.D.S., Hastings.
HENRY, G. P., Poultry, E.C.
HENRY, W. F., Poultry, E.C.
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HEPBURN, ROBERT, L.D.S.; late President of the Odontological Society, and late Dental Surgeon and Lecturer on Mechanical Dentistry to the Dental Hospital of London.
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JEWERS, F., Plymouth.
JONES, H., Shrewsbury.
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KEELING, W. E., Devizes.
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LLOYD, J. B., Rodney street, Liverpool.
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LONGHURST, H. BELL, L.D.S., Burlington street, W.
LONGHURST, H. C. H., L.D.S., Leicester.
LONGHURST, SYDNEY, L.D.S., Burlington street, W.
LOVEJOY, WILLIAM H., M.D., M.R.C.S., Portman street, W.
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MACKINTOSH, W., Stephen's green, Dublin.
MACLEOD, W. B., 43, George street, Edinburgh.
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Moore, Edward, Thames street, Windsor.
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Normansell, Frederick, L.D.S., 1, Gloucester st., Portman square.
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Ollive, Henry J., L.D.S., 73, Oakley street, Chelsea.
Orphoot, P., M.D., George street, Edinburgh.
Osborn, E. C., 93, Mount Pleasant, Liverpool.
Osborne, R., Dock street, Newport, Monmouthshire.
Palmer, Thomas G., L.D.S., Cheltenham ; late Dental Surgeon to the Cheltenham General Hospital and Dispensary.
Parkinson, George Thomas, L.D.S., Prince's buildings, Bath.
Parkinson, James, L.D.S., 36, Sackville street, Piccadilly ; late President of the Odontological Society.
Parks, William John, L.D.S., Newington crescent, Kensington ; Dental Surgeon to the British Orphan Asylum, Slough.
Payne, George W., L.D.S., Ebury street ; Dental Surgeon to the Royal Pimlico Dispensary.
Peacock, C. J., D.D.S., Scarborough.
Pearsalt, Thomas, 13, Upper Merrion street, Dublin.
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Pillin, L. B., L.D.S., Albemarle street, London.
Pilling, R. C., L.D.S., Blackburn.
Pitowsky, A., Barnstaple ; Dental Surgeon, North Devon Infirmary.
Platt, J. L., Murray street, Stirling.
Poundall, W. L., L.D.S., London terrace, Derby.
Reboul, A., L.D.S., Liverpool rd., N. ; Dental Surgeon German Hosp.
Richardson, E. J., L.D.S., Duke street, Manchester square.
Roberts, John George, 41, Upper Parliament street, Liverpool ; Assistant Dental Surgeon to the Liverpool Dental Hospital.
Robertson, J. A., D.D.S., Cupar, N.B.
Rogers, Charles, L.D.S., Cork street, W. ; late Dental Surgeon to the Dental Hospital, London.
Rogers, Claude, M.R.C.S., L.D.S., Cork street, W. ; late Dental House Surgeon to the Dental Hospital.
*Rogers, Henry, M.R.C.S., L.D.S., 16, Hanover square.
*Rogers, Joseph, M.R.C.S., L.D.S., 16, Hanover square.
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Rodway, H. Baron, Torquay.

ROSE, GEORGE HENRY, 61, Albany street
ROSE, HARRY, L.D.S. (*by curriculum*), Albany street, N.W.; Dental Surgeon to National Dental Hospital, and Metropolitan Free Hospital, Devonshire square.
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RYDING, W., L.D.S, Kildare street Dublin.
RYMER, SAMUEL LEE, L.D.S., Whitgift house, Croydon; Dental Surgeon to the Croydon General Hospital.
SAMUELS, P., L.D.S., Stockton-on-Tees.
SAUNDERS, EDWIN, F.R.C.S., 13A, George street, Hanover square; late President of the the Odontological Society; late Lecturer on Anatomy and Diseases of the Teeth at St. Thomas's Hospital.
SAUNDER, W. D., L.D.S., Seymour Street.
SCHOLEFIELD, J., L.S.D., Huddersfield; Dental Surgeon to the Huddersfield Infirmary.
SCOTT, J. W., L.D.S., Edgeware road, W.
SCULLY, JOHN, L.R.C.P., M.R C.S., L.D.S. (*by curriculum*), Bengal Army; late Assistant Dental Surgeon, Dental Hospital of London.
SERCOMBE, EDWIN, M.R.C.S., L.D.S., 41, Brook street, Grosvenor square; President of the Odontological Society; late Dental Surgeon to St. Mary's Hospital.
SHEFFIELD, ISAAC, D.D.S., 2, Stratford place, W.; late President of the Odontological Society of Great Britain.
SHEILS, WILLIAM J., South Mall, Cork: Dental Surgeon to the North Infirmary, Cork.
SIMMONS, J. J., L.D.S., 18, Burton cresent.
SMITH, J. A., L.D.S., Smith street, Chelsea.
SNAPE, J., L.D.S., Liverpool; Dental Surgeon to the Liverpool Royal Infirmary; Lecturer on Dental Surgery to the Liverpool Royal Infirmary School of Medicine.
STATHAM, JOHN LEE, L.D.S., 8, Osnaburg street; late Dental Surgeon to the Great Northern Hospital.
STEELE, JOSEPH, L.D.S., Whitgift House, Coydon; Dental Surgeon to the National Dental Hospital and to the Croydon General Disp.
STEWART, R. E., L.D.S., 37, Rodney street, Liverpool; Dental Surgeon to the Southern Hospital and Liverpool Dental Hospital.
STUCK, J. F., L.D.S., Liverpool.
TAYLER, DANIEL, L.D.S., Leicester.
TAYLOR, ROBERT, Bond street, Hull.
TIPPETT, G. C., Torquay.
TOMES, CHARLES S., M.A., M.R.C.S., L.D.S., (*by curriculum*), 37, Cavendish square; Lecturer on Anatomy and Physiology, and Assistant Dental Surgeon to Dental Hospital, London.
*TOMES, JOHN, F.R.S., M.R.C.S., L.D.S.; Surgeon-Dentist, Middlesex Hospital; Consulting Surgeon-Dentist, Dental Hospital, London.
TURNER, JAMES S., M.R.C.S., L.D.S., 12, George street, Hanover square; Assistant Dental Surgeon, Middlesex Hospital; Lecturer on Dental Mechanics, London School of Dental Surgery.
VANDERPANT, F. J., Kingston-on-Thames.
VASEY, CHARLES, L.F.P.S., L.D.S., 5, Cavendish place, W.; Dental Surgeon and Lecturer on Dental Surgery, St. George's Hospital.
VINEN, T. A. B., 8, Hanover square.
VISICK, A. B., Berwick-on-Tweed.
WALKER, G., L.D.S., Kennington park road, S.E.
WARREN, E. P., L.D.S., Old square, Birmingham.
WASHBOURNE, EDWARD NORMAN, L.D.S., (*by curriculum*), Southgate, Gloucester.

WATT, JOHN ROSS, Westbourne place, Leamington.
WEAVER, G., L.D.S., Up. Baker street, W.; Dental Surgeon, Cripples' Home.
WEISS, FELIX, L.D.S., Montague place, Russell square.
WHITE, THOMAS CHARTERS, M.R.C.S., L.D.S., 32, Belgrave road, S.W.; Hon. Dental Surgeon, Royal Pimlico Dispensary; Dental Surgeon to Belgrave Hospital for Children.
WILLIAMS, GEORGE, J., L.D.S., 17, Cavendish place, Cavendish square; Dental Surgeon to the National Dental Hospital.
WILLIAMS, G. S., L.D.S., Clifton.
WILLIAMSON, W., L.D.S., Aberdeen; Dental Surgeon to the Aberdeen Royal Infirmary and Lecturer on Dental Surgery to the University.
WILSON, A., Young street, Edinburgh.
WILSON, G., Whitefriar gate, Hull.
WILSON, J. A., High Street, Bangor.
WOODHOUSE, ALFRED J., L.D.S., 1, Hanover square, W.; Dental Surgeon, Foundling Hospital.
WOODHOUSE, W. H., Hanover square.
WOOLFRYES, HENRY A., L.D.S., 1, Gloucester street, Portman square.
WORSLEY, J., Fishergate, Preston.

The four gentlemen to whose names a star is prefixed signed the petition with the alteration of the words "fair yet searching examination" to "usual examination." See p. 346 and Editorial Article.

ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.*

GENERAL MONTHLY MEETING, JUNE 1ST, 1874.

E. SERCOMBE, Esq., President, in the Chair.

Mr. SEWILL announced presentations to the Museum from Mr. Rose, of Liverpool; Mr. Spence Bate, of Plymouth; and Mr. Turner.

Mr. HOLDEN mentioned the case of a gentleman, aged between 40 and 50, who two months ago consulted him under the following circumstances. Some months previously this gentleman had a molar extracted, and ever since the operation, had lost sensation on that side of the mouth. The tooth was the second molar of the lower jaw on the right side. Everything appeared quite right; there was no inflammation, hardness, or tenderness, but on an examination of the parts sensation seemed to have been lost all along the track of the dental nerve. He complained of great inconvenience resulting from the loss of sensation, and was very anxious to know whether he should recover it. The case was a perfect novelty, but he (Mr. Holden) told the patient that, judging from what he knew of nerves that had been injured in other parts of the body, he had good ground for believing that sensation would return, and on being pressed to name some period, he said five or six months. In the mean time he recommended that the mouth should be kept very clean and an astringent lotion used to the part. At the end of a month the condition remained precisely the same, and he had not seen the patient since. He wished to ask what had been the experience of members of the Society in cases of this sort, and what was the probability of its recovery.

Mr. THOS. ROGERS said, that although he supposed he had had his fair

* We are indebted to the *British Journal of Dental Science* for the Report of the Odontological Society for June, 1874.—Editor, M.R.D.S.

share of the usual accidents that happen to Dentists after the extraction of teeth, he had never met with one of this particular kind. The only reference to such a case that he could find was in a series of papers in the *British Journal of Dental Science*, by Mr. Salter, on accidents occurring after extraction, in which three or four such cases were mentioned, and he seemed to remember that in one of them the injury was permanent.

Mr Tomes said one such case had occurred in his own practice. A middle-aged lady, for whom he removed a bicuspid on the left side of the lower jaw, speedily complained of loss of sensation in the lips and gums thereabouts. This lasted eighteen months, and then she recovered perfectly.

Mr. Braine said that about this time last year he was called in to see a gentleman of the same age as Mr. Holden's patient. The first molar on the right side of the lower jaw was extracted, and immediately the patient said that one side of his face was paralysed and that he could not feel. On examination Mr. Braine found exactly the same parts were paralysed, as regards sensation, as those mentioned by Mr. Holden. The tooth was a very long one; one part of the fang was grooved, and had evidently been in contact with the dental nerve contained within the bone. A slight improvement commenced at the end of ten days, and at the end of five months sensation had practically returned.

Mr. Coleman had seen a case some years ago in which, after a long operation for the removal of a lower wisdom tooth on the right side, he found the patient had lost sensation over parts supplied by the right lingual branch of the fifth pair, and it was nearly a year before that side of the tongue recovered perfect sensation. Such cases might perhaps be accounted for by the shock given to the whole branch of the nerve by the sudden removal or breaking away of some of the branches, or by the inferior dental nerve becoming separated. It might be also accounted for in the following way. A friend of his told him that in a dissection at St. George's Hospital, some years ago, he found the dental nerve passing between two fangs of a three-fanged molar, and it struck him at the time that it would be utterly impossible to remove that tooth without a division of the dental nerve.

Mr. C. West said he had met with a similar case after an attempted extraction of the lower molar by an unskilful Dentist; the patient, a young gentleman, 25 years of age, complained of a paralytic feeling in the face. He (Mr. West) extracted the roots of the tooth, and in a short time the apparent paralysis left him.

Mr. Hawkins mentioned the case of a lady, fifty years of age, who came to him some two years since to have two teeth extracted, one on the right side and one on the left of the lower jaw. She lost consciousness on the right side of the face, and twelve months afterwards assured him that she had not the least return of sensation there. He had not since seen her.

The President said such cases as that mentioned by Mr. Holden were shown to be extremely rare; he himself had never met with a case of the kind. As to the probabilities of the case for the future, he imagined they could not throw much light upon it. Mr. Holden's experience as a surgeon suggested the only hope that could be held out to the patient. He himself had met with an accident, in which he severed a considerable nerve trunk, and the part beyond the injury remained insensitive over a year, but eventually sensation returned. Mr. Holden might, he hoped,

hold out hopes to his patient that sooner or later sensation would be restored to the injured nerve.

Mr. FAIRBANK then introduced a case which he described as of retarded front teeth of the upper jaw. It showed, he said, the ill effects of extracting the first permanent molar to make room for the regulation of the front teeth. A young girl, 16 years old, had the first molar so much decayed that he was obliged to extract it. He then made a plate, and proposed to pull the bicuspid back, but found that the second molar began to move forwards, and as the bicuspids moved backwards they seemed to become slightly elongated. He was very dissatisfied with the condition of the masticating teeth, and felt how much better it would have been if he could have saved the first molar. He quoted Mr. Tome's opinion, that in cases of crowded front teeth the first molar should be extracted even when only slightly decayed, and said he (Mr. Fairbank) considered this a great mistake, because the front molar was such an important tooth as being the centre tooth of mastication. He also believed that although the tooth was very delicate at first, and very apt to decay, still, if it was carefully tended for the first few years it seemed to get stronger, and very often outlived the bicuspids.

Mr. RANGER produced a cast taken from the face of a woman admitted to St. Thomas's Hospital on the 9th May, 1873. She was a Welsh woman, 35 years of age, and had a large globular swelling on the right side of the face. Mr. Simon removed the bone, and as the opening by the ala of the nose would not unite, he asked Mr. Elliott to make an artificial piece to fill up the cavity, and also supply her with an artificial nose-piece. There was great difficulty in getting the nose the right tint. It was made of white vulcanite, and enamelled with Truman's enamel. It was, however, too pink, and looked very artificial. After several trials it was found that mixing it with oxide of bismuth powder brought it down to a very fair skin tint. The patient had rather a sallow complexion; by heat it was got to rather a yellowish appearance. She did very well, and went away expressing herself very well satisfied. She could eat, talk and drink with the greatest comfort; whereas formerly they could not understand a word she said.

Mr. COLEMAN said he could sympathise with Mr. Ranger in the difficulty of getting the required tint; for some years ago, having made a vulcanite nose, he found the same difficulty. It was impossible to provide for the constantly varying colour of the face; when the patient was warm the nose looked too pale, and when she was pale the nose looked exceedingly red. It really was a most difficult matter to produce a colour which at all corresponds with that of the flesh of the face.

The PRESIDENT said, having made several attempts at artificial noses, his experience was that the fitting of the piece to the face had been fairly made, but he certainly could not induce those changes of colour which were much more constant than people supposed, unless they attempted to put on an artificial substitute.

Mr. TOMES, referring to Mr. Fairbank's remarks, said his statement as to the liability of front molars to decay was based upon a very extended series of observations, and he still thought that if a tooth was to be sacrificed, supposing the first permanent molar to be unsound, it was the best tooth to remove. As to the maintenance of those teeth, he found it extremely difficult to do so for any great length of time when the decay commenced early, more especially when it was interstitial. From the

cast it seemed that the malposition of the second molar was possibly due to the influence of a regulation plate.

Mr. C. TOMES took exception to Mr. Fairbank's statement that if the first permanent molar could be preserved for a short time it must become harder and stronger. He was quite unaware of any anatomical arrangement by which defects in enamel could be remedied by the tooth being kept in the mouth a few years more. He was also unable to understand what was meant by saying that this particular tooth was the centre of mastication, and how another tooth taking its place could possibly be inferior to it in that respect.

Mr. THOS. ROGERS considered that, as a rule, the extraction of the first molars was the best way of treating a crowded state of the mouth, from the circumstance that they are usually the first to decay; but they ought to be retained until the second molars are well up.

Mr. FAIRBANK explained that during the first part of the treatment the plate did not cover the molar tooth. During the latter part, after he had moved the bicuspids back, he did cover the second molar with vulcanite, but it had then moved forward into the gap formed by the extraction of the first molar. In the first plate made, the band passed behind the second molar, so that it would have a tendency to press it forward.

Mr. OAKLEY COLES then a read a paper "On the Condition of the Mouth and Teeth during Pregnancy," of which the following is an abstract:

I propose in the following paper noticing—

1. The changes and general condition of the teeth during pregnancy.
2. The condition of the gums.
3. The oral secretions, with their changes and influence upon the teeth.
4. The neuralgia of pregnancy.

And lastly, The remedial agents useful during pregnancy.

1. *The Changes and general Condition of the Teeth during Pregnancy.*—In a large number of cases the period of pregnancy passes by in a perfectly normal manner, the processes that take place are physiological, and no evidence is given (in the mouth at any rate) of any pathological process having occurred. In other instances we find the first few months of pregnancy accompanied with severe toothache. This is usually (if it be a first pregnancy) attributed to neuralgia, and not to odontalgia.

When the pain arises from the teeth, we generally find them the subject of caries. The one variety that I have found the most prevalent is the brown caries.

As a rule, the upper and lower bicuspids will be seen in various stages of decay, the lateral incisors of the upper jaw standing next in liability to caries, and then the central incisors; the lower incisors, as a rule, escape, as under ordinary circumstances, apart from pregnancy.

The lower classes seem more liable to this special description of caries during and subsequently to pregnancy than those of the middle and upper sections of the community.

A second variety is where decay takes place on the prominences of the palatine cusps of the upper bicuspids and molars. The cavity presents a ragged margin, and does not generally give rise to pain, since its existance is soon noticed by the tongue of the patient, and relief sought. The dentine is softened, but not much discoloured, nor is the enamel changed in appearance, beyond the opacity surrounding the outline of the cavity.

A third description of decay is the soft caries.

Near the margins of the gum and around the necks of the teeth the enamel seems either to have disappeared or to have become so softened in texture that a sharp excavator or enamel chisel easily passes through it: the teeth are very often exquisitely sensitive, and conscious of every thermal change. The removal of the softened tissue is an operation inflicting considerable pain, and it is very easy to go on cutting away till the pulp-cavity is nearly approached. Sometimes this state of the enamel and dentine is confined to a limited area, in other instances it passes round the neck of the tooth like a ring. Whenever it is present, the enamel is generally less opaque in appearance than in the first variety of caries referred to, and there is, as a rule, no green or brown discoloration or deposit on the labial surface of the upper incisors.

All the teeth are liable to an attack of this process of disintegration; but the upper bicuspids, lower bicuspids and molars, and upper laterals and canines, seem more subject to it.

There is a modification of this last variety, in which we find a general softening of the tooth without any actual decay, as it is ordinarily understood. The whole of the tooth (most frequently an upper bicuspid) becomes very sensitive to the touch. A cold air gives severe pain, hot fluids produce discomfort, and occasionally even an instrument covered with wool, or the touch of a napkin, will give a shock to the patient's nerves. Later on we find the tooth more loosened, and at last it becomes a source of so much irritation to the patient that even within a few weeks of her accouchement she prefers extraction to the constant plague of an aching tooth.

Although we have loosening, there is no great elongation, or, to speak more correctly, protrusion from the socket, and we find that the loosening has been partly due to the absorption of the alveolus that has taken place. On removing the tooth, the periosteum of the fang is seen to be scanty in substance and anæmic in appearance. The tooth can be cut easily with the excising forceps or hand-saw; and on examining the pulp we are able to observe its fatty condition, unmistakably distinguishable from the ordinary healthy or inflamed pulp.

The cut portion of the tooth has also a soft greasy surface, very different to that which is felt with any tooth after extraction for inflamed pulp or periosteum with alveolar abscess. We have, I believe, a condition that may be fairly and scientifically called "fatty degeneration."

There is another explanation for the softening in otherwise sound teeth during pregnancy, and that is either a diminution in the supply of earthy salts, to repair the waste of constant use, or an actual reabsorption of the calcareous constituents of the teeth, such as takes place in the bones during the progress of osteo-malacia. Osteo-malacia is a disease peculiar to women, and generally connected with the pregnant or puerperal state, and it is quite possible that the condition of the teeth that we have under consideration may be due to a modification of such a pathological process. This hypothesis is further strengthened by the fact, that in some cases softening takes place without any appearance of fatty degeneration.

It is somewhat singular, though I think it is capable of explanation, that "soft or white caries," with softening and loosening of the teeth unaffected with caries, is more commonly found amongst the upper classes, and those who have the reputation of being well nourished, than amongst the poor and lower middle class. It is perhaps desirable to mention that teeth plugged before pregnancy are as frequently the seat of caries as

others; and we not unfrequently find the margins of a cavity given way, leaving the plug standing, and only held by its retaining points.

2. *The Condition of the Gums.*—I have failed to discover any condition of the gums that can be regarded as specially and alone connected with the pregnant state. Whilst, therefore, speaking of those changes that take place in the gums, we must bear in mind that their appearance is due to influences in operation at other times than during pregnancy.

When the teeth are the subject of "brown caries," with green deposit on their crowns, and tartar around the necks and fangs, we generally find the margin of the gum raised, glistening, and distended; immediately below the margin there is a well-defined reddish-purple line; at other times we find midway between the margin of the gum and the purple line an intermediate space covered with cast-off epithelial cells. The surface of the gum is hot and painful to the touch, and bleeds readily. The affection is not confined to any special part of the Dental margins, but is most severe in the incisive region of both the upper and lower jaw.

In other cases we find the gums of a rather full colour, with their margins rounded, but not very much thickened; they are separated from their attachment to the necks of the lower teeth (the incisors, canines, and bicuspids especially), and on pressing gently from below upwards, on the anterior surface of the gum, a thin fluid, and very often pus, is seen to ooze from around the neck of the tooth and free border of the gum.

We have here, doubtless, a state of passive congestion owing to impeded circulation, in the course of which a serous or corpuscular transudation takes place through the walls of the distended veins.

Associated (most frequently) with white caries, or softening and loosening of the teeth, we have an anæmic condition of the gums. Here, instead of the margins being thick and rounded, they are thin, pale, and shrivelled in appearance, withdrawn from the necks of the teeth, yet still adherent at a higher point of attachment; not unfrequently there is seen a prominent ridge a little beyond the free border, and this is sometimes of a deeper tint than the surrounding membrane. If any condition of the gums could be said to be especially associated with pregnancy, it would be that which I have just described, more especially as it is notably present in cases of frequently recurring pregnancy.

3. *The Oral Secretions, with their Changes and Influence upon the Teeth.*—During pregnancy the secretion of saliva is increased to a great extent, in many cases by irritation of the second and third branches of the fifth pair of nerves, and also by the direct stimulation derived from the acrid eructations of the stomach and the morning sickness during the early months of pregnancy.

Test-papers, applied early in the morning, will determine the acidity of the contents of the mouth in a large majority of the cases examined, especially in first pregnancies; later in the day it is difficult to obtain data by means of test-papers that are of any value, since there are many agencies at work tending to counteract (if present) the acidity of the saliva. Patients will tell you that during their first two pregnancies (in most cases) they awake with an acid taste in the mouth, and after the sickness that usually occurs the acidity in the mouth is much more pronounced, whilst the vomited matter is so acid in its character that, even after standing for a considerable time, or if treated at once, by the addition of a little carbonate of soda or potash, a free liberation of carbonic acid takes place.

Before the sickness the secretion of the saliva* and mucus is generally increased, and the flow continues under the influence of the acid principle arising from the stomach.

From the recent investigations that have been made, there can be little doubt, I think, that the most fruitful source of the excessive flow of saliva is the acid matter regurgitated from the stomach, which undoubtedly possesses the power of stimulating the salivary glands.

Dr. Sidney Ringer, in his 'Handbook of Theurapeutics' (p. 78), says:—"It has been fully established by repeated and careful experiments, that dilute acids, when taken into the stomach, possess the power to check its secretion; while, on the other hand, alkalies stand prominent among the most powerful exciters of the secretion of the gastric juice. From these facts the more general law has been inferred—namely, that acids possess the power to check the production of acid secretions from glands, while they increase the flow of alkaline ones, while the very reverse is the case with alkalies, which are supposed to check alkaline but to increase acid secretions. This general law (says the author) is made the more probable, as it fully explains the effects, which experience has shown to be true, of acids on the secretions of the alimentary canal in disease."

We see from the foregoing extract that there is more than one way in which to account both for acidity of the stomach and increased flow of saliva. The salivary secretion may arise from dental irritation or neuralgia; and I may here mention that this has its analogue in the increased secretion that flows from the lachrymal glands when the ophthalmic division of the fifth is the seat of irritation. This† alkaline saliva being swallowed would increase the flow of the gastric fluids, whilst acrid eructations following, we have the salivary glands still further stimulated.

In Rigby's 'System of Medicine' (1853, p. 63), under the head of Disorders of Pregnancy, the author says:—"The breath is usually sour, and an acid state of the saliva is indicated by the instantaneous reddening of litmus-paper laid upon the tongue." There is yet another mode in which increased flow of saliva and the production of an acid reaction may be produced, and that is by the gratification of the morbid taste that sometimes occurs in pregnant women for acid drinks and sour and unript fruits.

Salivation‡ may occur, but it is rather rare, and, when present, is "easily distinguished," says Dr. Montgomery (quoted by Dr. Churchill,

* "The act of speaking, and also that of vomiting, are preceded by a flow of saliva."—J. Marshall, F.R.S., 'Outlines of Physiology,' first edition, 1867, p. 56.

† "When first secreted, and especially during active secretion, the saliva is alkaline; that of the submaxillary is less so than that of the parotid. In fasting, the moisture of the mouth is nearly neutral, or even acid; at that time consisting probably almost entirely of mucus."—Marshall, op. cit., p. 58.

‡ "The secretions are sometimes preternaturally excited, and one of the most remarkable of the effects of pregnancy is salivation. Some pregnant women have been as completely salivated as if they had been under the influence of mercury; and hence the danger, lest the whole of the irritation should be attributed to the medical attendant if he should have given his patient mercury in any form . . . It is necessary, therefore, to distinguish between it and mercurial ptyalism. The saliva is simply increased, continuous for a time, and then disappears without leaving any trace of previous irritation. In a few cases it has continued to the end of pregnancy, but generally it ceases at the end of the fourth or fifth month."—Murphy, "Manual of Midwifery," second edition, 1862, p. 53.

'Manual of Midwifery,' fourth edition, 1860, p. 129), "from the ptyalism induced by mercury, by the absence of sponginess and soreness of the gums, and of the peculiar fœtor, and by the presence of pregnancy."

Under certain conditions the saliva itself may become acid in its reaction, that the buccal mucus, by acting upon the decomposing animal tissues lodged around the teeth, may set up an acid fermentation; and, lastly, the mouth is likely to be invaded by acid agents in pyrosis and morning sickness.

After carefully examining the evidence afforded by published works, and the results of my own observations, with special regard to the action of saliva and mucus during the pregnant state, I cannot but conclude that the great prevalence of caries in women at that period is due in a very large measure to the acid conditions that obtain in the mouth.

It is very remarakble, if simply a coincidence, that the brown variety of caries, which I have found most prevalent in the lower classes, should correspond in its appearance with caries produced artificially out of the mouth by means of lactic and butyric acid.

Although in the majority of cases we find increased flow of saliva and mucus. in other instances, the amount seems normal; and in these cases it is that we get the white caries and softening, with fatty degeneration, the gums being anæmic and receding, but still attached to the higher part of the necks of the teeth. Decay is not so rapid under these conditions, and seems to indicate impaired nutrition rather than altered secretions as a cause, strengthening negatively the views put forward as to the influence of increased and acidulated fluids in the mouth.

But even here we must not overlook the effects of localised acidity, such as occurs round the margins of the gums, as pointed out by Tomes (op. cit., p 555), and we must bear in mind that the symptoms which I have described, such as softening and disintegration, with white caries may arise from this cause, either alone or in combination with impaired nutrition; for it would, I think, be exceedingly unsafe to declare absolutely the specific cause for a certain condition of the teeth during pregnancy, when there are so many factors operating, the proper value of which it is almost impossible to take into account.

In an earlier part of my paper I referred to the decay that is sometimes seen on the palatine cusps of the bicuspid and molar teeth, and mentioned that this class of caries was interesting from the peculiarity of its situation. There are, I think, two explanations that may be offered for this fact (beyond, of course, the consideration of special structural defect): one is, that the inner cusps of the bicuspids and molars are those against which fluid would be most forcibly ejected in vomiting, and partially so in pyrosis; and, further, that the tongue, when at rest, very often lies in contact with these teeth, and so the secretion of acid mucus from the side of the tongue would in time operate injuriously by dissolving the enamel.

4. *The Neuralgia of Pregnancy.*—When pain arises in the face or in the regions of one or more teeth during pregnancy, without the presence of caries, we may reasonably ascribe it to a neuralgic origin. While, further, neuralgia thus occurring may have no relation to the teeth, but be entirely dependent on either impaired or perverted nutrition. (Anstie.)

It is, therefore, not singular that we should find it associated with an anæmic condition of the system, and a wasting, rather than carious condition of the teeth.

After giving numerous quotations the author proceeded—

It would enlarge to much the present paper to give all the extracts bearing upon the subject of neuralgia during pregnancy that are to be found in the various works on midwifery and nervous diseases. The condition is one that has been fully recognised, and needs, I think, no further evidence in support of the fact of its occurrence.

In most cases the neuralgia is more severe in the first pregnancy than in the subsequent ones; and this remark applies also to toothache, for, although the caries may advance with successive pregnancies, the pain is much more severe in the early pregnancies than afterwards.

5. There are other changes that take place in pregnancy that demand some attention.

"The blood has a rather lower specific gravity than the average, from the deficiency of blood-corpuscles. The quantity of white corpuscles and of fibrine, on the other hand, is increased." (Kirke's 'Physiology,' 5th ed., p. 64.)

And further there is an almost unexplained liability in pregnant and puerperal women to plugging of the veins (thrombosis). It is not impossible that this fact may in some measure account for the impaired nutrition, from which the teeth certainly in some cases suffer.

The dropping out of the teeth is, there can be very little doubt, due to an arrested nutrition, and I think has its analogue in the transverse markings of the nails, met with after severe and exhausting diseases.

Impaired nutrition, manifested locally, may be due to a perversion of the nutritive elements, or rather the direction of nutrition into a new channel, in order to supply the wants of the growing fœtus.

6. *The Remedial Agents useful during Pregnancy.*—The author advised attention to the general health and diet, advocating the use of oatmeal.

Carious cavities should be filled, Hill's and Jacob's fillings being preferred. The use of cod-liver oil was also recommended, and as tooth powders precipitated chalk and charcoal.

When the teeth are the subjects of soft caries, or softening or fatty degeneration of the entire tooth, accompanied with great sensitiveness, I have found collodion of the greatest valuable. The tooth must first be wiped over with cotton-wool saturated in absolute alcohol, to remove the greasy surface and absorb any moisture. The collodion may then be painted over the whole of the tooth that appears through the gum, and affords a most efficient yet simple protection against thermal change and irritating substances or liquids. This may be done thrice daily, but, as a rule, twice a day will be found to be sufficiently frequent.

Quinine and chalk as a dentifrice (ʒj to ʒij) are also good in some cases in allaying pain of a neuralgic character, and may be ordered with great advantage.

In periostitis the usual remedies, such as iodine tincture and carbolic acid, seem the most valuable; whilst both of these agents diluted may be used as a stimulating application to the gums where there are apparently impaired nutrative processes.

The carbolic acid is also very good where there is a deficient secretion of saliva, such as sometimes occurs: the most convenient form is the following:

℞ Acid. carbolic. . . . gr. xij.
Glycerin. ʒss.
Aquæ Rosæ ʒj.

In those cases in which a purulent discharge arises from around the necks of the teeth, the chloride of zinc (gr. iij to ℥) is useful; it must be applied well with a brush, so as to thoroughly enter between the tooth and gum.

Chlorate of potash and bromide of potassium may also be used sometimes with advantage in certain conditions of the gums and mucous membrane; chlorate of potash being valuable on account of its healing and antiseptic properties, and bromide of potassium for its reputed sedative and anæsthetic action.

The treatment of neuralgia must vary according to the cause of the disease and the condition of the patient; as a rule, local stimulation is beneficial, by means of either mustard plaster or chloroform applied with liniment (℥j to ℥vij); sal volatile, hot tea, large doses of quinine, small doses of alcohol, and light and nourishing food, so as to restore the impaired condition of the nervous system. (Aitkin.)

The remedy that I have, however, found the most useful is the syrup of the phosphate of iron (Parrish's Chemical Food),—a teaspoonful twice daily, ten minutes after meals.

Tooth-extraction for odontalgia or neuralgia must never be undertaken without a full recognition of the risk* incurred by the mother and child, and the responsibility attaching to the operator; and when absolutely necessary, is, probably, least injurious if performed under the influence of an anæsthetic, such as nitrous oxide or ether, or the two combined.

Mr. SEWILL said he did not think Mr. Coles had made out a case showing that the pathological condition of which he spoke were such as would be associated necessarily with pregnancy. He (Mr. Sewell) looked upon them as arising from the fact that the vitality of the patients was diminished to some extent during that period, and therefore local disease was likely to increase its action. The rapid decay of the teeth he considered as rather due to the chronic dyspepsia accompanying these cases.

Mr. TURNER said how far they might be justified in following Mr. Coles' directions for the general treatment of their patients was a very grave question. As a Dental Surgeon he preferred treating a person locally and leaving the medical man to follow the constitutional treatment necessary in such cases. The local treatment was very limited; the great thing to give relief was to detect any exposed bone, and to mitigate the acid condition of the saliva.

The PRESIDENT said he was rather inclined to believe that the sufferings of women during gestation were due to exalted sensation during that period. The uterus and the teeth appeared to be very mysteriously associated under these conditions. Cases had been recorded where the uterus had been the seat of intense pain, leading to continual miscarriages, apparently due to diseased teeth, and if so they might reasonably suppose the reverse of that might take place.

After a few words, in reply, from Mr. Coles, the meeting then adjourned to November.

The PRESIDENT then returned the thanks of the Society to Mr. Oakley Coles, and to those gentlemen who had made communications and presentations. He also congratulated the members on the successful nature of the proceedings of the first session of the year now brought to a close.

* "Abortion has been known to follow this simple operation (extraction.) Chloroform may be inhaled, or chloric either administered to relieve the pain; but iron will best remove its cause."—Murphy, op. cit., p. 92.

OBITUARY.

THOMAS B. HITCHCOCK, M.D., D.D.S.

The sad news of the premature death of Dr. Hitchcock, the Dean and the life and soul of the Harvard Dental School, has arrived since the last number was issued. He is best known in this country as the editor and annotator of *Wedl's Dental Pathology*, and as the author of *Reports on Dental Histology*.

Threatened a few years since with Phthisis, he was unable to relax his labours in science, in practice, and at the School; now he has succumbed to an attack of Cerebro-spinal Meningitis, adding one other to the roll of victims of overwork.

An enthusiast in all he undertook, he had won for himself the highest esteem of the medical profession in Boston; now that he is gone it will indeed be hard to fill his place, for few such as he are to be found in the ranks of our profession.

Honest of purpose, fearless of speech, and kindly of heart, he had won the heart and admiration of every one with whom he came in contact; now that he has died in the prime of his life and in his full vigour, none will be more missed or more sincerely mourned; it will indeed be long before those who have lost in him a warm-hearted and dear friend will cease to recall the memory of pleasant hours spent with Dr. Hitchcock.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.

EXAMINATION FOR DIPLOMA IN DENTAL SURGERY.

THE following gentlemen having passed the necessary examinations, were admitted Licentiates in Dental Surgery at a meeting of the Board on the 29th ult., viz.:

Alabone, Alfred, Newport, Isle of Wight.
Bryant, Frank, Huntingdon.
Canton, Frederick Arthur, Southampton Row.

The above were all students of the Middlesex and Dental Hospitals. One candidate failed to acquit himself to the satisfaction of the Board.

The following were the papers set to the candidates at the examination for the Degree held on the 22nd June.

Dental Anatomy and Physiology.

5 to 8 o'clock p.m.

1. Name and describe the microscopic appearances of the tissues concerned in the formation of the enamel and dentine.

2. State the ages at which, and the succession in which the members of the deciduous and permanent sets of teeth are respectfully erupted.

3. What are the various purposes fulfilled by the "cementum" in man and other animals?

Dental Surgery and Pathology.

5 to 8 o'clock p.m.

1. Explain the symptoms and pathology of irritation and acute inflammation of the pulp respectively. Describe the mode of formation and character of secondary dentine, and the symptoms associated with its development.

2. Describe fully the forms of impaction of the third molar teeth, and the consequences frequently resulting from their retarded and difficult eruption. State the treatment of such cases.

3. What is an alveolar abscess? Describe its causes, and the changes which occur in its development, with the several issues to which it may lead.

Anatomy and Physiology.

2 to 4 o'clock p.m.

1. Give the anatomy of the temporo-maxillary articulation. Describe its several movements; and mention the muscles by which they are respectively effected.

2. Describe the various changes of form which the rima

glottidis undergoes; and state how and for what purposes these variations are produced.

Pathology and Surgery.

2 to 4 o'clock p m.

1. In what form does syphilis affect the interior of the mouth? Describe the characteristics and treatment of each form.

2. Describe the alteration in tissue which exists in chronic enlargement of the tonsils; and state the inconveniences resulting from the condition, and how they are to be remedied.

On Monday, 29th, the candidates had to pass the *viva voce* examination.

LONDON DENTAL HOSPITAL.

CASES TREATED FROM JUNE 1ST TO 30TH, 1874.

Extractions. Children under 14	325
Adults	494
Under Nitrous Oxide	211
Gold Stoppings	120
White Foil ditto	100
Plastic ditto	175
Irregularities of the Teeth treated surgically and mechanically	54
Miscellaneous Cases	213
Advice Cases	38
Total	1730

ASHLEY GIBBINGS, *House Surgeon.*

CORRESPONDENCE.

THE TESTIMONIAL TO MR. SAUNDERS.

"SIR,—I much regret to see that the proposal to suitably acknowledge the great service which Mr. Saunders has rendered in effecting the removal of the hospital to Leicester Square seems likely to miscarry, through the ill-judged haste with which it has been pushed forward, and has, moreover, elicited so much adverse criticism, that Mr. Saunders can hardly, without loss of dignity, accept the proffered honour. Many persons, myself among the number, strongly object to the erection of portraits or busts of living personages; in the rooms of the Odontological Society, we have, I am glad to say, few portraits and no busts, save that of John Hunter, whose right to be placed there no one acquainted with the history of Odontology can dispute.

The question propounded by a correspondent in your pages last month, "with whom did the proposition to erect a bust originate?" remains unanswered.

I have no desire to see the rooms of the Odontological Society converted into a sculpture gallery, yet if the bust of Mr. Saunders is to be placed there, I should feel it only right to erect also busts of those gentlemen who were actively concerned in founding the Dental Hospital and establishing the Dental Diploma; who gave, not large sums of money, it is true, but their time and energies in a far more uphill battle than the removal of the hospital to a new site has proved. I only regret that the expression of an obligation should have taken this form, which is distasteful to so many; I would willingly contribute towards some less objectionable form of testimonial, for I fully acknowledge that a real and great service has been rendered; but let it not be forgotten that Mr. Saunders' claims upon our gratitude commence with the proposition for removing the hospital, and that the hospital was a great and decided success before its removal was, or could have been, contemplated.

VIGILANS.

TO THE EDITOR OF "THE MONTHLY REVIEW OF DENTAL SURGERY."

SIR,—It is generally known among the members of the Dental profession that a petition has been presented to the Council of the Royal College of Surgeons, asking it to open its portals once again to those who did not take the degree of L.D.S. during those years of grace when it was conferred upon all respectable practitioners who passed a fair examination.

No new degree could have been introduced under more liberal auspices. All, who were willing to do so, were invited to join in the advantages which its promoters anticipated from its institution. Those who did not accept the terms so freely proffered were actuated by different motives. Some were less sanguine as to the success of the new degree than those by whom it was instituted. Some, possibly contented with their own position, were not public-spirited enough to care for improving the status of others; whilst other *few* possessing a surgical qualification professed to think it would be beneath their dignity to have conferred upon them that which they were pleased to consider an inferior diploma, quite forgetting that the first object of the degree was to elevate the social and professional standing of the profession in which they were not too proud to practice. I cannot but think that these latter, fortunately a minority, took a very selfish and egotistic view of measures, the *sole* object of which was to benefit a general body of men, not *individuals*.

If we may judge by the present movement, those who then held aloof have now discovered their mistake, as also those who refused to give their much required and personal aid by teaching and the like in the early days of that Dental Hospital which has done so much in a few years to improve and elevate our profession, and it is noteworthy that all its first officers and teachers were those same men who had done so much to secure a recognised position for the dentist: moreover, they were, we must recollect, those who had already made their own position, and therefore had nothing to gain, but really much to lose personally, by the time and labour they so willingly devoted to the noble and unselfish work of placing the least of their professional brethren in the same position as that which they had gained for themselves.

A few years have proved the honesty, the solidity, and the utility of their efforts, and there are many now who, standing aside in the past, would too-gladly connect themselves with the Licentiates of the Royal College of Surgeons, and possibly sincerely regret that they lost the

opportunity of participating in the credit due to those who first persuaded that College to affiliate the special branch of Dental, with that of General Surgery—a step, the importance of which can never be over estimated in the *memorabilia* of our professional history.

This petition is as great a compliment as could be paid to that small and devoted band (representing the amalgamation between two bodies who *both* wished well to their profession) who accomplished those arduous tasks to which allusion has been made: indeed the truest and the most lasting monument that could have been erected to them is the fact, that in a decade, the practice of the profession is wondrously improved, and above all that its position seems to be thoroughly recognised and assured whilst we find that those who gave but little practical aid to our hospital on its first foundation have come forward liberally, now that funds, not time, were required to assist its latest development, thus confessing their profound appreciation of the labours of its founders, whose names I trust may never be forgotten, for though they worked so *unostentatiously*, our debt of gratitude to them cannot be impressed too strongly upon the minds of this and every future generation.

This brings me to the main point of my letter, which is to explain why, as a teacher, and thus intimately connected with the profession, and allowing none to excel me in my desire to raise its standing, my name has not hitherto appeared in the lists of the memorial in question. I will gladly support its objects, and I know that many others would do so too, upon the condition that it be thoroughly understood that each aspirant for the degree should prove himself qualified for its conferment in every particular, by professional conduct and otherwise, and that no one, having the opportunity, who did not take it during the years of grace should be permitted to become *diplomé* unless he submits to an examination, by no means lenient, but *exactly* similar to that instituted at the present time for the Alumni of our Dental Schools, and given at the same periods of the year *in common* with that for ordinary competitors. Should it be otherwise, those who have devoted their time, energy, and considerable expense to attain the object of their ambition would justly feel themselves aggrieved.

Having pursued a strict curriculum of study in addition to the requisite examination they would consider that the rules under which they had entered had not been fairly adhered to, and here we must be mindful that the diploma is often now the qualification—nay, the *sine quâ non*—for a good appointment. Glad, indeed, shall I be when I see the letters L.D.S., or, better still, L.D.S. and M.R.C.S. appended to the names of every dental practitioner; but, in the present case, we must recollect that the petitioners have only themselves to blame that they are left behind the Rubicon, and that, therefore, if they desire to cross it, they must pass *precisely the same tests* as their younger brethren, minus the curriculum.

Believe me, Sir,

Yours obediently,

32, Old Burlington Street.
June 29th, 1874.

S. HAMILTON CARTWRIGHT.

TO CORRESPONDENTS.

ALL communications intended for the Editor should be addressed to the care of Messrs. SMITH, ELDER & Co., 15, Waterloo Place, Pall Mall.

All inquiries respecting Advertisements and Subscriptions should be sent to Mr. GEORGE BUTCHER, 4, Crane Court, Fleet Street, E.C.

THE MONTHLY REVIEW
OF
DENTAL SURGERY.

No. III. AUGUST, 1874. Vol. III.

THE ODONTOLOGICAL SOCIETY'S TRANSACTIONS.

Some five or six years ago the Council of the Odontological Society commenced to issue their Transactions in Monthly parts, containing, besides the papers, full reports of the discussion at each meeting. Previously the Transactions had appeared at irregular intervals of not less than a year, in volumes containing selected papers only. The new arrangement, it was understood, was adopted in order to increase the interest of all the members of the Society in its work, and especially to draw closer the connexion of the Society with the country members, to keep those gentlemen conversant with the progress of professional work, and to enable them to enter into the discussions of the Society by means of written communications.

The desired objects were undoubtedly achieved by this new arrangement which gave great satisfaction to all the members of the Society, who did not therefore grudge the great expense necessarily incurred. It is evident that punctuality in issuing each number was essential to keep up the value of the Transactions in this form, and until recently no complaint upon this subject could be made,

the monthly parts having been always in the members' hands within a week or two following the meetings. During the past year or so, however, the appearance of the parts has become more and more irregular. They have rarely been sent out at less than a month after the meetings, while occasionally a much longer time has elapsed, the number for June last—for instance—has not yet appeared. Numerous complaints have reached us about this matter which we believe is causing general dissatisfaction. It is the general opinion that the cause of the delay, which is undoubtedly injurious to the Society, might be easily removed; only that if the Council really feel unable to keep the system working, it would be better to revert to the old plan of publishing occasional volumes. By that means at least, the present great outlay would be curtailed, and the funds so released might be applied to some other undertaking. We should be sorry to see this latter alternative adopted, and to do our best to prevent it we thus give expression to the general dissatisfaction which exists and publicity to the complaints of correspondents who have addressed us upon the subject.

ROYAL COLLEGE OF SURGEONS.

DENTAL DIPLOMA QUESTION.

At a meeting of the Council of the Royal College of Surgeons of England, held on the 9th of July, 1874, the following resolutions were adopted in reference to the Petition recently presented to the College:—

"That as recommended by the Board of Examiners in Dental Surgery, the request of the Dentists signing the Petition, received the 6th instant, be granted, and 'hat persons who were in practice as Dentists or who commenced their professional education as Dentists prior to September, 1859 (the date of the Dental Charter), be ad-

Fig XLV.



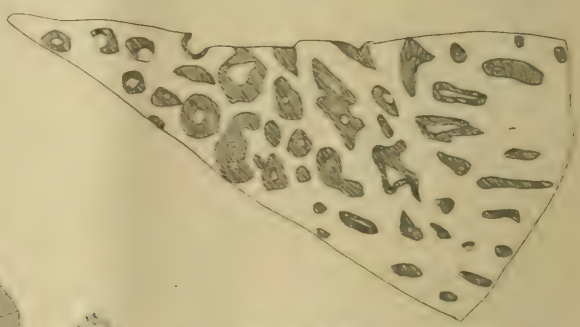
Two Teeth of Helodus in situ upon a piece of shale, superior surface. Nat Size.

Fig XLVI



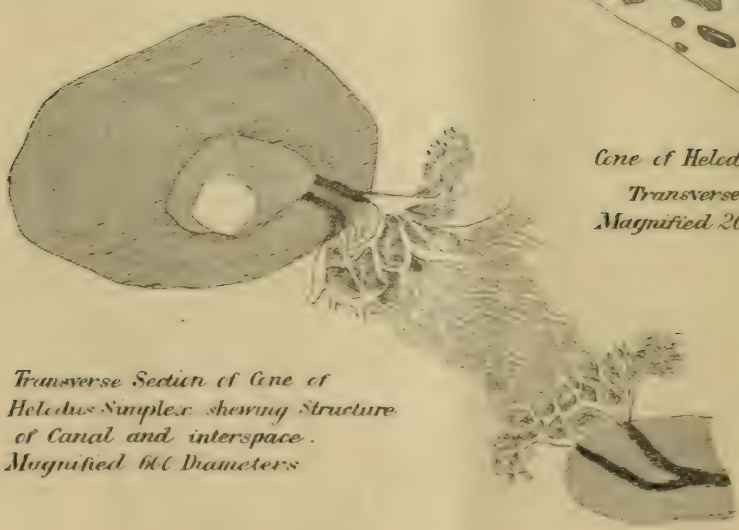
Cone of Helodus Simplex. Vertical Section. Magnified 20 Diameters.

Fig XLVII



Cone of Helodus Simplex. Transverse Section. Magnified 20 Diameters.

Fig XLVIII



Transverse Section of Cone of Helodus Simplex shewing Structure of Canal and interspace. Magnified 600 Diameters

T.Bessent, lith, 29, Essex St, Strand.

mitted to examination for the Diploma in Dental Surgery in this College, on the conditions in force up to September, 1863; and upon the understanding that they will have to submit themselves to the written and *viva voce* Examinations now required of all Candidates for the Diploma."

ON THE

MICROSCOPICAL STRUCTURE OF FOSSIL TEETH,

FROM THE NORTHUMBERLAND TRUE COAL MEASURES.

By W. J. BARKAS, M.R.C.S.E., L.R.C.P., London.

[*Continued from p.* 61.]

HELODUS.

This genus is exceedingly rare in these Coal Measures, my cabinet containing two teeth, and the only other specimens that have been obtained are recorded in the third volume of the "Transactions of the Northumberland and Durham Natural History Society" as being in the possession of Mr. T. Atthey; it is more common in the Coal formations of other districts, especially the North Staffordshire Coal field, but Helodus is found most frequently and in greatest variety in the Subcarboniferous Limestone, from which formation in the neighbourhood of Richmond, in Yorkshire, and from Iowa, U.S., I possess specimens. The number of species of this genus that have been named, is very large, viz., twenty-nine, they have all been founded upon teeth alone; but I do not believe that these are all distinct species, some of them being so similar to each other as to be practically the same, what slight difference there may be observed between them being in all probability due to difference of situation in the mouth, others belong to the genera Psammodus, Cochliodus, Chomatodus, &c. It will be seen, therefore, that there is a great amount of confusion concerning the species of the genus Helodus; this does not arise so much from the want of a strictly correct definition of the external characters of the teeth of that genus,but principally from the great tendency of Agassiz to form genera and species upon the most trivial distinctions. That great palœontologist, as well as Professor M'Coy, considered Helodus to be a subgenus of Psammodus, and not a distinct genus at all; this

however is a mere supposition which could only be proved by the discovery of a whole jaw or palate with the teeth gradually diverging from one form to the other, which had certainly never been done when they made their statements. Fortunately these doubts are in a fair way to being settled, for Mr. Ward, of Longton, has since found undoubted teeth of Helodus in groups, he also possesses the whole dental arrangement of this fish in connection with the spine and other parts of the body, and I am given to understand that not any of the teeth approach in similarity to the characters of Psammodus, Cochliodus, or Chomatodus. I also hear that these discoveries of Mr. Ward are being investigated by Sir Philip Egerton, who intends to publish the results of his investigations as soon as possible. Professor Newberry states in the second volume of the "Geological Survey of Illinois," page 74, that Helodus, in his opinion, is a distinct genus from Psammodus, but that many of the so-called species of Helodus are really varieties of the three genera mentioned above, in fact he possesses a group of what are, he believes, the median teeth of Cochliodus, some of which are identical with the teeth named by Agassiz, Helodus lœvissimus, H. didymus, and H. turgidus, but, unfortunately, he does not state distinctly whether undoubted teeth of Cochliodus accompanied these so-called median teeth; if there did not, then this group was in all probability a whole palate of Helodus, and shewed that these three species of Agassiz were really one only. He also refers to a group of teeth apparently identical with H. planus, and which, he thinks, more closely resembles Psammodus than Helodus. Agassiz has, however, since that work appeared, placed the so-called H. planus into the new genus Psephodus. I am quite disposed to agree with the above authors that many of the teeth named Helodus by them, are not that genus at all, but Psammodus, &c., yet I feel bound to maintain that Helodus is a distinct genus so long as typical teeth are never found associated with the above genera, and because they differ from them quite as markedly as the teeth of Cladodus differ from those of Hybodus. Helodus simplex I consider to be a tooth that presents all the characters belonging to this genus in a most marked degree, and it would be impossible for any palæontologist to mistake it for Psammodus,

&c. The teeth I possess from these Coal Measures resemble H. simplex more closely than any of the other species, so much so that I do not hesitate to place them in it. Helodus possesses certain characters, both externally and internally, in common with Psammodus, Pleurodus, Pœcilodus, &c., and is therefore classified among the group of Selachians designated Psammodonts.

Helodus simplex from our Coal Measures is a comparatively small tooth, my specimens measuring nearly one-third of an inch in length, one-tenth of an inch broad, and one-eighth of an inch high, while the teeth from the Staffordshire Coal fields are about as large again, but in all other respects they present somewhat similar characters to the above teeth; the general shape of the tooth approaches to that of Pleurodus Rankinii, but in the former the superior surface is raised into a cone more or less rounded, the extremities are prolonged, but more so at one end than at the other, and there are no lateral prolongations. On account of the cone being nearer one margin than the other, the tooth has the appearance of being compressed laterally, one side of the cone being gently inclined towards the base, the other being perpendicular or even concave from the apex being recurved; the prolongations of the extremities proceed directly outwards, and are slightly curved upwards near their termination. The tooth is composed of two parts, a crown and a base. The base is about the same thickness as the crown, and varies in shape, except on its superior surface which is always convex, and fills the concavity on the inferior surface of the crown; the sides are irregularly ridged. The crown is cone-shaped on its superior surface, which surface is smooth, somewhat glistening, and abundantly marked with fine depressions, these punctations are larger than those observed in Pleurodus, but much smaller than the pores in Psammodus; the inferior surface is regularly concave and does not follow the conical form of the superior surface. The two teeth of H. simplex that I have referred to as being in my possession, are situated upon the same piece of shale, and are articulated one with the other as they were evidently arranged in the mouth of the fish when living, (Fig. XLV). I should judge, reasoning from its analogy to other selachians, that the teeth were situated in the mouth with their short axis

arranged antero-posteriorly, and with the apices of the cones pointing backwards towards the throat; also that they were arranged upon a jaw in the same manner as in Pleurodus, and were not arranged in rows so as to cover the whole of the floor of the mouth as in fishes of the Ray family. I trust that Sir P. Egerton, having all Mr. Ward's specimens before him, will be able to settle these points satisfactorily in his paper on Helodus. The minute structure of these teeth has been very rarely referred to by palæontologists. Dr. Pander in a paper entitled "Ueber, die Ctenodipterinen des Devonischen Systems," being the only author that I have read that enters into it at all minutely. I will give a very literal translation of what he says on the subject, and then point out some errors that he has committed by describing minutely the structure of the teeth of which I have made sections.

"If the tooth be cut vertically throughout its whole length, it will be observed that the difference between the base and the crown, consists only in the different course of the medullary canals, which in the former take a horizontal direction, and form a network by the anastomoses of their branches, while in the latter they go vertically upwards, very seldom branching or inosculating with one another. The fine calcigerous tubules spring from the canals of the base, as well as from those of the crown, but the tubules of the base are considerably larger. If a horizontal section be made of the cone, the medullary canals are seen to be encircled by fine, small tubules; immediately surrounding each vascular canal is a lighter coloured circle, this lighter ring is caused by the canals not dividing directly they arise, hence in this space there are large spaces of clear tissue between the trunks of the tubules, but so soon as the tubules divide, the ground substance begins to look duller and darker, this darkening grows greater and greater till the end of the branching is reached, *beyond this dark portion is a clear space, into which no tubules enter*,* this light space forms a boundary between each vascular system. This separation of the medullary canals, and the tubules which belong to them, from each other by a clear space, is considered by Agassiz to be a characteristic which does not belong to Cestracionts but is peculiar to

* The italics are my own.

Chimæroids and several Rays, and which enables us to distinguish the one family from the other."

The bases of the teeth I have examined are permeated by large medullary canals, with an average diameter of one one-hundredth of an inch, which at their commencement are irregular in size, and do not run any particular course, but with their branches form a coarse network, the branches being however, as large as the canals proper; as the canals proceed upwards, the branching and anastomosing become less frequent, they decrease in size, and assume a vertical direction; in the lower portion of the base therefore, there is a preponderance of canals over tissue, about the middle they are equal, and in the upper part the tissue is decidedly in excess. In the crown the canals run parallel to the vertical axis of the tooth, are continuous with those in the upper portion of the base, and are considerably smaller, being about one three-hundredth of an inch in diameter, they branch seldom, but when branching does occur, they are given off at a very acute angle, and do not anastomose, but run nearly parallel with the main vessel from which they arose; the canals and their branches terminate on the external surface, and are patent, not being closed in by dentinal substance or enamel, it is to this circumstance that the abundant pitting observed on the exterior of the superior surface is due. In Fig. XLVI. the arrangement of the canals in the inferior portion of the base is not shewn, but it exhibits it in the upper portion of the base and in the crown very clearly.

Fig. XLVII. is a transverse section of the crown examined under a low power, it shews that the canals do not anastomose with each other to any great degree, are very irregular in outline, and surrounded by a dense layer of dark tissue, which has been gradually deposited within the canals; this dark tissue possesses a similar structure and appearance to the dentinal substance entering into the formation of the base, and I cannot detect any concentric arrangement in it. It will be noticed that the diameters of the canals have been diminished at least one-half by this deposition of tissue within them, which shows that the tooth must have pertained to a fish that had lived for some time, and it will be necessary to remember that when a tooth of a young fish is examined, the appearance

will be somewhat different from the above, the canals being larger, and having a smaller quantity of dark dentine surrounding them. Immediately encircling each canal is a light space, then a darker ring, the tissue beyond this being of uniform colour, but not so clear as the light space surrounding the canal; this appearance is more clearly pourtrayed in Fig. XLVIII. The reason for these concentric coloured circles will be very evident after I have described the arrangement of the calcigerous tubules. The tissue between the canals, both in the base and in the crown, is homogeneous, and is permeated by calcigerous tubules which arise from all the canals, but are most abundant in the crown. The calcigerous tubules in the base are larger than those in the crown, and arise by a comparatively large trunk, their diameter being, on an average, one five-thousandth of an inch, they branch freely and anastomose with the branches from neighbouring systems. The tubules in the crown measure at their origin about one eight-thousandth of an inch, they pursue a longer course before branching than those in the base, passing through the dense layer immediately surrounding the canal and the light space beyond, but at the point where branching occurs, there is deposited between the branches a narrow ring of black granular matter, to which is due the dark, or third circle I have mentioned as arranged around the canals; this granular matter does not appear to have any connection with the tubules. The branches, after passing through this layer, divide and subdivide very freely, and anastomose with each other to form a fine close network, *the ultimate branches of the network of one system uniting directly with those of adjoining systems* (Fig. XLVIII). These ultimate branches are exceedingly minute, and can only be clearly seen under a power of six hundred diameters. The structure I have just detailed is purely Cestracion†, and closely resembles that of Pleurodus, and somewhat that of Psammodus, the statement, therefore, of Pander, that Helodus was allied in structure to Chimæroids and several Rays, is quite erroneous, there being no boundary between the vascular systems. The reason of his error is very palpable, and perhaps excuseable, because there is certainly the appearance of a boundary when a transverse section is examined under a lower power than two hundred diameters, but it requires,

as I have said already, at least six hundred diameters to shew the junction of the branches satisfactorily.

I have now finished the description of all the Selachian teeth that have been discovered in the Northumberland True Coal Measures, at least, all that I have discovered, and I am not aware that any collector has obtained other genera or species. In my next paper I shall draw attention to the genus Janassa, or as it was formerly named, Climaxodus, the only representative of the Ray family that has been found in this formation, the minute structure of which markedly resembles that of some modern Rays, and just as distinctly differs from the Cestraciont structures I have been describing during the last few months.

THE SURGERY OF THE MOUTH,

By FRANCIS MASON, F.R.C.S.,

SENIOR ASSISTANT-SURGEON AND LECTURER ON ANATOMY AT ST. THOMAS'S HOSPITAL.

(*Continued from vol.* 3, *page* 37.)

C. SOLID GROWTHS OR TUMOURS OF THE ANTRUM.

In a previous paper on the "Accumulation of fluid of various kinds in the Antrum," I pointed out the great difficulty that exists in many cases, in arriving at an accurate diagnosis without first making a tentative puncture to ascertain the exact nature of the contents of the swelling. It should, however, be remembered that even with this precaution the surgeon may occasionally be misled. Thus Mr. Stanley,* in speaking of diseases that originate in the antrum, refers to a class of cases apparently commencing in collections of fluid within that cavity, but which are followed by malignant ulceration of its walls; not accompanied by any morbid deposit, and therefore, not presenting in any stage the characters of a distinct tumour. We must, therefore, not fail to bear in mind that in an apparently simple case of suppuration there may possibly be superadded a much more serious disease. In illustration of this I may allude to a case I saw in 1872. It was one of malignant tumour of the antrum in a woman aged 57. Two ounces of pus were evacuated by incision, much to the patient's relief. No tumour was suspected at the time, but

* "Diseases of bones," p. 283.

some months after an operation was undertaken to remove the growth.

Tumours or solid growths of almost every variety have been described as occurring in connexion with the antrum. They may originate in the cavity itself or they may commence in the neighbourhood and ultimately invade it. The commonest forms seem to be the fibrous, the fibro-recurrent, and the medullary cancer or encephaloid tumours: other varieties are less frequently met with such as fibro-cartilaginous, cartilaginous, osseous, fatty (consisting principally of stearine), myeloid, epitheliomatous, erectile, sarcomatous, and osteo-sarcomatous tumours, with or without cysts, as well as polypus of the antrum, although as will be seen, this last disease is exceedingly rare.

The general *symptoms* in all the above varieties are as a rule much alike, and their origin seems in most cases, to be traceable to one or more unsound teeth, or to some other source of irritation. In a case under the care of Sir W. Fergusson, at King's College Hospital, the growth was attributed to the wire fixings of the patient's artificial teeth.

As to the period of life at which these growths are met with, I have reason to believe they are most commonly found in patients between 40 and 50 years of age. But one sees them in the young as well as in the aged, thus in January, 1864, I had the privilege of assisting Sir William Fergusson to remove a tumour from the antrum of a boy aged 14. The growth had been coming seven months. The palate was much bulged but the nostril was not blocked up. Notwithstanding the rapidity of the growth and its suspiciously malignant appearance, the case did remarkably well, and in May, 1873, the patient was in excellent health having had no return whatever of the growth. Mr. Stanley states that he saw an antral tumour in a child 4 years old, and I myself operated in 1868, on a man 62 years of age. Operations on children are generally attended with better results than those undertaken on the adult, hence in children it is supposed that this disease is usually of a non-malignant character. On this point I may say that some of the worst looking cases give the best results, and I know of two patients now alive in whom an operation was undertaken twenty years ago, when the disease was considered hopelessly incurable. There is of course a limit to

surgical interference, but in the majority of instances something can generally be done, if not to cure, at least to alleviate the patient.

Just as in suppuration of the antrum, so in the case of a solid growth there is a gradual enlargement of the front wall of the cavity, and also of the cheek. The deformity of the face may be well marked, but considering the size of the growth the disfigurement is not so perceptible as might be expected. There may or may not be much pain, and if there be, it is often of a neuralgic character. In other cases, as in one now under my care at St. Thomas's Hospital, the woman, aged 49, experiences at intervals very sharp, shooting pains through the tumour, and manipulation is attended with excruciating pain. This patient, who was kindly sent to me by my friend Dr. B. W. Richardson, was quite well until eight months ago, when she had a bad molar tooth removed from the upper jaw. There was, she states, a copious exit of matter at the time. The opening into the antrum was enlarged and ever since she has had a most offensive and profuse discharge from the aperture. She has but two teeth remaining in the upper jaw—incisors—and these are so loose as almost to drop out spontaneously. Close to the inner canthus there is a fistulous opening looking not unlike a lachrymal fistula, and the left nostril is completely blocked up with a solid growth. The case is one probably of a fibroid character, and presents the usual symptoms of such tumours.

As these growths increase in size they displace the walls of the antrum in various directions, the bony cavity becomes much attenuated, and should the tumour extend backwards into the pharynx it may possibly interfere with respiration and deglutition. Again, the nasal fossa and the nasal duct may become so encroached upon as to prevent the passage of tears to the nose, occasioning *stillicidium lachrymarum*. The invasion of these parts is said to be one of the characteristic features of malignant disease. Such tumours grow from or are intimately attached to the lining membrane of the antrum, and invariably fill the cavity. Again, the orbit may become involved to such an extent as to cause by pressure on the globe of the eye permanent blindness, indeed there seems to be no limit to the extent to which these growths may attain.

With regard to *diagnosis*, tumours of the antrum may be confounded with suppuration in the cavity, but the distinguishing features of the latter are that there is not necessarily much pain, that the anterior wall of the antrum is especially the part thrust out of place (but this symptom is not always well marked), and that fluctuation may generally be detected. I have had within the last four months at St. Thomas's Hospital, three cases of suppuration of the antrum, illustrating these points. In all there was not much pain or discomfort, in all there was tolerably distinct fluctuation, and in all a cure was effected by a free opening made near the canine fossa and without the extraction of any tooth.*

As showing the extent and rapidity of growth of some of these tumours, I may here refer to a case under the care of Mr. Holmes Coote.† It deserves mention more especially because a ligature was placed on the common carotid for hæmorrhage from the tumour. The patient was an agricultural labourer, 64 years old, who had medullary cancer of the antrum, which had commenced only three weeks before but which had grown very rapidly. All the neighbouring parts of the face were involved as the ear, forehead, cheek, neck, submaxillary region, and one side of the nose. The tumour extended into the fauces, descended into the upper part of the pharynx and thrust the soft palate forwards. After a short time the most prominent parts increased not only in size but began to ulcerate, and bled daily to the extent of a small teacupful; Mr. Coote thereupon tied the common carotid above the omohyoid, and although the hæmorrhage from the tumour was arrested, yet the patient became hemiplegic, and died on the fourth day after the operation.

It seldom happens that a spontaneous cure takes place, but a case is related by Mr. Abernethy, of a man who, when ten years old, noticed a tumour on his cheek, caused by a disease of the antrum, which attained the size of a walnut, and then remained stationary. It subsequently increased rapidly, "and when he was in his twentieth year, the whole fungus slouged away, during a fever, and never returned."‡ Such cures by spontaneous sloughing occasionally happen, as

* See *Monthly Review of Dental Surgery*, June 1874, p. 36.
† *Lancet*, May 15th, 1858.
‡ Cooper's Dictionary, Art. Antrum.

the reader is aware, in other parts of the body. Thus, Sir James Paget refers to a remarkable instance, under the care of Sir William Lawrence. "A strong man, aged 46, had a tumour of the thigh, of about nine months growth. The femoral artery passed through the tumour, and the latter sloughed away without any hæmorrhage. The cavity in the thigh completely healed."† Again, I saw a woman, some time ago, at the Westminster Hospital, who had a tumour of the breast as large as a fœtal head. The skin sloughed, and the whole of the diseased mass came away, the patient making an excellent recovery. There seems no valid reason, therefore, why a tumour of the antrum should not undergo a similar spontaneous enucleation, although such a circumstance is highly improbable.

In other cases, the patient dies, either from the disease involving some vital part, as the brain, or from exhaustion induced by the excessive discharge. At Bartholomew's Hospital* there was a case of a boy, in whom a medullary tumour, beginning in the antrum, made its way through the orbital plate of the frontal bone and cribriform plate of the ethmoid into the cranium. He was only comatose 48 hours before he died, though the portion of the swelling projecting into the cranium and causing a corresponding depression in the anterior lobes of the brain, was equal, in size, to a small orange.

The rapidity of the growth varies greatly in different cases; thus, it may be only of a few weeks duration, or it may continue to increase steadily for a number of years. As a rule, the quicker the growth the greater the malignancy, but there are not a few exceptions to this general law, and, as already stated, some of the worst-looking tumours belie their appearance. In rare cases there is distinct pulsation in the tumour, and this symptom may even exist in tumours of a non-malignant character. Such an example was under the care of Sir James Paget, in 1861. The patient was a lad, aged 18, who first noticed a swelling of the face, seven years ago. It had not encroached on the nasal wall, nor was the palate depressed, but the tumour, when it had escaped into the orbit, communicated "a slight feeling of pulsation to the finger, which was synchronous with the

* Paget's Surg. Path.

† Cooper's Surgical Dictionary, Art. Antrum.

radial pulse." The tumour was found to grow from the wall of the antrum, and had a slender attachment. "It was an ordinary fibrous tumour, the most common form of tumour found in the cavity of the antrum."*

Beside the numerous fistulous openings that are found in these cases about the cheeks and mouth, there are occasionally other complications of the soft parts, for example the tumour may invade the mucous membrane of the mouth and adjacent structures, or the soft palate, to such an extent as to render complete extirpation of the diseased mass well nigh impossible. Again, as in a case I saw operated on by Sir W. Fergusson, in May, 1861, there were two distinct tumours, one situated in the substance of the right cheek, the other in the Antrum and roof of the mouth.†

The above description will, I venture to think, give the reader a fair idea of the general symptoms of tumours that appear to have their origin in the Antrum. The subject of tumours, in this region, is so extensive that it is not my intention to enter minutely into the respective microscopic character of these growths. Such details will be found in works on Pathology. The principle object I have in view is to lay before the reader a few practical points so that he may be enabled the better to understand and deal with cases that come under his observation.

As I shall have to refer again to the diseases of the Antrum, when I consider tumours of the jaws, I shall conclude this paper with a few words on erectile tumours and the so-called polypi of the antrum.

Erectile tumours of the antrum are very rare. One case happened to M. Gensoul. "The tumour was soft and vascular, and quicksilver impelled into the morbid structure, readily pervaded it throughout."‡

Respecting the so-called "*polypi of the antrum*," if I may judge from the researches I have made on this subject, I should say that the term had been applied somewhat indiscriminately to growths in the maxillary sinus.

Polypus of the Antrum, and limited to that cavity—I mean such a growth as we commonly find in the nostroils

* *Medical Times and Gazette*, March 9, 1861.

† *Lancet*, August 31, 1861.

‡ Lettre chirurgicole sur quelques maladies graves du sinus maxillaire et de l'os maxillaire inferieure. P. 28.

—the myxomatous or fibrocellular tumour must be very rare.*

I do not remember to have seen a case of the kind. Bordenave states that the membrane of the maxillary sinus, like that of the nostrils, may give origin to sarcomata or fungus excrescences, "known under the name of polypi."† Luschka states that these polypi are not so rare as is supposed. They are an hypertrophy of the submucous tissue, covered with mucous membrane.‡ Mr. Heath remarks that "such polypi are closely allied, apparently, to the small cystic growths in the mucous membrane of the antrum, described by Giraldès. When the connective or alveolar tissue predominates, the fleshy polypus is produced; when the glandular element is especially affected we have the cystic form produced. Intermediately, when the fibrous element is very loose and we have some glandular hypertrophy, the semi-gelatinous polypus is produced, which closely resembles the nasal polypus."§ Billroth has described an instance of polypus of the antrum having a long pedicle.

The question is, are these growths the same, pathologically, as those we find in the nostril, and do they commence in the antrum and involve the nostril secondarily, or have they their origin in the nasal cavity and then invade the maxillary sinus?

Sir Benjamin Brodie, writing in 1855, gives it as his experience, that "the antrum serves as a receptacle for polypous growths, which are mere intruders from the nasal cavity, and not disease of the jaw itself;"‖ and concludes a clinical lecture, delivered in 1834, in these words: "Surgical writers describe polypi as arising from the mucous membrane of the antrum; nay, some have gone so far as to tell you how to apply a ligature round the base of such polypi, so that they may wither and drop off. The history and treatment of such polypi is altogether hypothetical. No polypus, I believe, ever existed in the antrum, around which a surgeon could put a ligature, and I never heard of

* See Chelius's Surgery, Cooper's Surg. Dict., Miller's Surgery, etc.

† Trans. Syd. Soc., 1848.

‡ Paget's Surg. Path., p. 456.

§ Diseases of Jaws.

‖ *Lancet*, March 10th, 1855.

the operation being performed."* On the other hand, M. Bordenave states that "Ruysch and several other authors, mention examples of polypi, and cases are even recorded in which several sinuses at a time have been found affected. M. Livret mentions a polypus of the maxillary sinus which extended to another originating in the frontal sinus."†

Such are the differences of opinion.

"Who shall decide when doctors disagree."

ODONTOMES.

(Traité des Tumeurs. Par Paul Broca).

ODONTOMES GENERALLY.

(*Continued from page* 28.)

V. HISTORICAL.

The expression, *vitium primæ conformationis*, evidently proves that M. Wedl perceived the origin of this dental tumour, but proves at the same time that he did not know the mode of its formation. That which produces odontomes is not really a defect in primordial conformation, but a malformation following a disease of the pulp, and as to the organ of enamel that the author has appeared to consider as the point of departure of the lesion, we can affirm at the present time that it was only reached secondarily in consequence of a primitive disease of the pulp. This fact was quite unknown in France when M. Forget presented a case to the Surgical Society on the 11th July, 1855, which is now in the Dupuytren Museum, and which may, perhaps, be cited as one of the most remarkable cases of dentified odontomes. "Is this," said he, "an exostosis which, developed in the centre of the bone, has warped and crowded the teeth, and driven away the bulbs? Is this an exostosis of the fangs or even of the teeth?" In doubt, M. Forget asks the advice of the Society.‡ Two Members only replied, M. Houel allowed it to be an eburnated exostosis, similar to those which are formed sometimes in the frontal sinus and maxillary sinus; but M. Maisonneuve, who, by a singular coincidence, had brought a radicular odontome the very same day to show to the Society,

* *Lond. Med. Gaz.*, Vol. 15, Dec. 6, 1834.

† Observ. sur la cure des polypes de la matrice, de la gorge et du nez.

‡ *Bulletins de la Soc. de chirurgie*, 1re i.—vi., p. 58, 59.

expressed the opinion that M. Forget's tumour was like "a true exostosis of dental substance." I cite these opinions to show what amongst us then was the knowledge of surgeons respecting the nature of dentified odontomes. It was admitted without contradiction that these were exostoses, that is to say tumours formed of osseous tissue. It was merely asked whether these exostoses proceeded from the teeth themselves or from the bone which surrounded them. This question was not settled. M. Forget took his case to M. Robin, who studied it with the microscope, and proved that it was a mass of dentine enclosed further both on its surface and in its substance by enamel.† It was evident from this that the tumour could not proceed from the maxillary bone, that it depended exclusively upon the dental envelopment first appearing in the follicles during the odontogenic period.

This was the opinion of M. Robin and, above all, of M. Forget, who having had occasion to examine many other osseous or ossiform tumours of the jaws, occurring both in man and in the horse, published in 1859 a history, when all these cases were described and drawn, as well as the case preceding. I found most of these cases‡ either in the museum of the school of Alfort or in the Dupuytren museum; I have examined them microscopically, and have assured myself that they are true odontomes, but principally or exclusively cemental, some coronal,§ others radicular, and differing besides considerably in the aspect and structure from the first case of M. Forget. I explain this instead of uniting all the cases in a single group, M. Forget, on the contrary, has sought to establish a difference

† M. Robin thought besides he had found in this tumour a certain quantity of cementus characterized by the presence of osseous corpuscles; but I have studied the same case with the greatest care, and I believe I can affirm that there is no cementum present. There is to be found only on the point where the enamel borders on the denture, those blackish, irregular, narrow, branch-like cavities which I described above as being in normal teeth at the termination of the denture, and which, according to the most competent observers, much resemble osseous corpuscles. (See above page, 285, text and note, and p. 393, fig. 12.)

‡ A. Forget *Des anomalies dentaires et de leur influence sur la production des maladies des os maxillaires.* Paris, 1859.

§ Cases of coronal cementum odontomes occur in all species of the horse. It is known that the teeth of the horse possess a coronal cementum. In man, on the contrary, the cementum only exists on the fangs, and the cemental odontomes are all radicular.

between them. According to him, the first tumour, that which he presented to the Surgical Society and which contained dentine and enamel, was due to a *primitive* affection of the dental bulbs "to an *original* morbid admission of different dental elements," whilst the other tumours were due solely "to a *secondary* hypertrophy of one or more of these same elements."* In other words, the first was the consequence of an accident of formation, and the others of an accident of nutrition occurring after the formation of the dental tissues.

This distinction cannot be admitted if one considers that the dental tissues, being neither vascular nor expansive, are not susceptible of true hypertrophy. It is not necessary to demonstrate this with respect to dentine and enamel. As to cementum, it can grow in thickness by the juxtaposition of new layers on its surface; this occurs especially when the tooth is carious, and it may even result in small growths surrounding and covering the fangs, but these cemental productions which are not due to hypertrophy assume a stratified disposition, and do not resemble in any way cemental odontomes, which are besides distinguished by their relatively enormous volume, and by the malformation, always considerable, of the tooth. The tumours attributed by M. Forget to a secondary hypertrophy of the dental tissues, do not differ with regard to their origin from those which he considers have just title to appear during the odontogenic period.

Seeking to determine the mode of formation of these latter tumours, he admits that they are due to hypersecretion of the nutritive juices supplied in the normal state by "elements whose union constitutes the bulb or the odontogenic capsule." Among these elements he makes "the membranes designated by most anatomists under the name alveolo—dental periosteum, play a most important part." "Thus is explained," says he, "by the morbid activity of the secretive organ, the abnormal production of ivory, which is found above all at the centre of the pathological aggregation, and that of the osseous matter, or cementum, very abundant in circumference."† It appears from these passages and, above all, from the whole of the exposition of the author, that in his mind the accidental production was constituted from the beginning as a dentified tumour;

* Forget, *loc cit*, p. 26.

in other words, the hypersecretive juices collected together were organized in dental tissues. This theory is not reconcileable with odontogenic facts. Dentification can only be the last act of a complicated histological evolution which necessitates the intervention of elements and transitory tissues, and cannot be reduced in any case to the pure and simple organization of a blastome. We know, besides, that if the wall of the follicle could, at a given moment and at a determined point, become the agent for the production of cementum, this membrane is altogether strange to the production of dentine and enamel, which are dental tissues par excellence. It would be easy to multiply objections, but it is not necessary. If we consider that dentified odontomes are formed of very hard invascular tissues, incapable of becoming hypertrophied or of increasing by themselves, and that these tumours are always much more voluminous than the follicles in which they appear, we can easily understand that the appearance of the dental tissues, of which they are composed, must have preceded the formation of a tumour, soft, vascular, and constituted by the hypergenesis of the elements of a dental bulb, a tumour which was dentified only after having acquired its entire volume. In other words, a dentified odontome is but the last act of evolution of an accidental production which plays, in regard to the pathological dental mass, the same part as the normal bulbs do in regard to normal teeth. This proposition, which I believe I have been the first to put forward, can, doubtless, be believed from purely theoretic considerations, but we can only rest with certainty upon the comparison of dentified odontomes, with odontomes in the course of dentification, and with non-dentified odontomes.

I shall now expound the history of these latter odontomes. It will be shorter than the preceding one, for I have not found in the early writers of our century any text, any observations tending to establish distinctions between the different kinds of soft or fleshy tumours of the jaws. All these tumours were confounded together under the name osteosarcomæ. It was not supposed that there could be the slightest difference between them and the osteosarcomæ of other bones, and the descriptions given

* *Loc sic*, p. 20. I said above, in the note to p. 322, that there was no true cementum on the case in question.

of them are so far from precise, that it is impossible to interpret them.

Dupuytren is the first author who has separated from osteosarcomata certain encysted, enucleable and benignant tumours. He has the merit of determining the diagnosis, and of showing that they could be radically cured by simple enucleation.* But he was very far from suspecting their nature, when he discovered a cause one day for one of these encysted tumours, "whose formation appears to have been determined by the incomplete extraction of a carious tooth," to the introduction "of some particles of animal food which had penetrated into the cyst through the alveolus of the extracted tooth."† This explanation had a success and was developed and generalized in 1840 by M. Forget, who showed how the alveolus could embrace and afterwards entirely enclose a fragment of alimentary substance deposited in its cavity in such a manner as to constitute a cyst, but who knew well that this cause was insufficient to explain the formation of fibrous productions which constitute the greater part of solid cyst. "Let us recognize for them," he adds, "a predisposition doubtless in its nature, but appreciable in its effects which in several respects have a certain resemblance with sarcomatous tumours properly so-called."‡ I cite these passages to show that the dental bulbs were never the cause.

* Dupuytren. The *cysts which are developed in the thickness of the bones and their different kinds* in his *Oral Lessons*, collected by the Society of Physicians, Paris, 1832-34, in 8, 1, iii., p. 1—26. The sign of particular cressitation known under the name of parchment sensation, has not all the worth that Dupuytren has attributed to it in the diagnosis, as it is observed in very different affections, this sign was besides established in 1817 by Ashley Cooper, in a patient (Elizabeth Hall) afflicted with a cartilagenous tumour of the jaw, and published the following year the work of this surgeon *upon exostosis* (A. Cooper, *Œuvres chirurgicales*, trad., fr., Paris, 1837, gr. in 8, obs 548, p. 602). This change is made by a brusque dry movement, as if the walls were made of *parchment*. "Let us add that A. Cooper operated upon his patient by enucleation. Dupuytren had practised in 1813 enucleation of a 'fibrous body,' in the jaw of a young man who was the subject of observation v., in his work on *osseous cysts* (loc. cit. p. 17), but it was not published till 1833, whilst that of Cooper was published in 1818.

† Oral Lessons, loc cit, p. 10.

‡ Amédée Forget, *Recherches sur les kystes des os maxillaires et leur wembement*, Paris, 1840, in 4, p. 9.

ABOUT PEPSINE.

BY J. EDWARD LINE, D.D.S., ROCHESTER, N.Y.

[Read before the Alumni Association of the Pensylvania College of Dental Surgery.]

PEPSINE, to which attention was first called, so far as its uses in dentistry are concerned, by Mr. Oakley Coles, of England, has been before the profession a sufficient length of time to warrant, if possible, a somewhat definite statement of its virtues as a dental therapeutic.

Our attention was first called to this agent by a short paragraph in the *Dental Cosmos*, and which, if we recollect rightly, was taken from the proceedings of the Odontological Society of Great Britain. Some time later there appeared in the *Missouri Dental Journal* three articles, by gentlemen of known ability, every one of which contained valuable information in a concise form. We wish here to acknowledge our indebtedness to these articles; for they are the only ones worthy of mention that have fallen under our eye. Our experiments with pepsine date from the appearance of the first of these contributions to dental literature.

We may state, by way of preface, that this substance was discovered by Schwan, and was supposed by him to be an essential constituent of gastric juice; that is, a constituent, the absence of which from gastric juice would render the digestion of albuminoid substances an impossibility. This view, which is the prevalent and perhaps only tenable one, was vigorously opposed by many, among whom may be mentioned Liebig.

Chemically, according to the analysis of Schmidt, pepsin consists of carbon, hydrogen, nitrogen and oxygen. It is precipitable by mercuric chloride, lead acetate, sodic chloride, tannic acid and alcohol.

It is classified by Wood, together with lactic acid and yeast, as a solvent; and is mentioned by the same author as "an excellent palliative in *dyspepsia*." In his remarks on gastric juice, he says that it (gastric juice) was employed years ago "with much advantage in carious and sloughing ulcers, to dissolve the dead bone and flesh. It thus not only removed foul and irritating matter, and gave a clean surface to the ulcer, but seemed to promote the healing process by a gentle stimulation." If gastric juice could accomplish all this, then it seems reasonable to sup-

pose that the same thing, and much more, might be brought about by the use of its catalytic element, pepsin, alone and in its greatest purity.

Inasmuch as pepsin has been known as a possible dental remedy for less than two years, and for a less time still experimentally, but few cases, favourable or otherwise to its use, have been put on record. Those which follow are contributed for whatever of information they may contain, and as an incentive to others to experiment with an agent that promises to become invaluable to him who would save, not only the merely exposed pulp, but such as have already undergone partial disintegration.

Case I. This case, which came under our care April 3rd, 1873, was that of a young man about twenty-five years of age, in sound health, and whose teeth, with one exception, were in a remarkable state of preservation. On examination we found a very large cavity which involved the mesial and crown surfaces of the first right superior molar. Further examination brought to view an opening into the pulp chamber, large enough to admit a sixteenth of an inch burr-drill. This we enlarged to double its original size. The cornu of the pulp which corresponds to the antero-lingual angle of the tooth was absent, and the cavity it once occupied filled with the products of suppurative inflammation, together with such other matter as gained admission from without. This accumulation was removed to some extent by means of tepid water thrown from a syringe.

Our next step was to make a paste of pepsin and water. This we carried on a little ball of cotton into the cavity of the pulp, and then covered with sandarac varnish on cotton.

Next day (April 4th), we removed the contents of both cavities, and because of the limited action of the pepsin, introduced more, this time saturated with glycerin. Sealed with the same material as before.

The third day (April 5th), we removed the work of the day previous, syringed thoroughly with tepid water, and examined. We found that portion of the pulp-chamber already alluded to perfectly clean, the pulp in good condition, and not more sensitive than in cases of simple exposure.

We now filled the pulp-chamber with a thick chloroform

solution of Canada balsam, covered this with a bit of paper, and introduced enough of Worff's cement to fill the cavity of decay. The only immediate result at all unfavourable was slight pain, which lasted, however, but a short time.

About three weeks later (April 25th), the gentleman called and reported that the tooth had been, as a whole, tolerable; that it had pained him off and on for two or three days after his last visit; and that it now took his attention only when he happened to bite something unusually hard. We gave him some encouragement, and requested him to report again.

Seven months later (Nov. 7th), he called to complain that for about two weeks the tooth had been very sensitive to changes of temperature. On examination we found the cervical portion of the filling entirely gone; a condition not uncommon to mineral-cement fillings of whatever kind when located near the margin of the gum. We removed the remainder of the filling and *looked*, but in vain, to find the opening into the pulp-chamber. Satisfied that nothing could be determined by that means, we began to *feel* for the opening with a very fine excavator, when in it went, to the astonishment of at least the owner of the tooth. We found the pulp alive and healthy, a thin partition of bone between it and the cavity of decay, which latter had, of course, been increased in size to the extent of that part of the pulp-chamber set off by the new deposit of dentine. We removed the ragged edges of the newly-made opening, capped the pulp again, this time with an ether solution of balsam, a bit of paper, and Worff's cement.

Case II. This case presented April 22nd, 1873. The party, a married lady about twenty-eight years of age, was not in health at this time, but has since greatly improved; a condition of things undoubtedly due, in part at least, to the thorough renovation to which her mouth was at that time subjected. The tooth was the first right superior bicuspid, the pulp fully exposed, the outer cornu gone. We applied pepsin saturated with a weak solution of hydrochloric acid, covered with paper, and then introduced a gutta-percha filling.

Three days after (April 25th), we removed the above; but as the pepsin had not done its duty fully, we introduced a fresh quantity and covered it with sandarac on cotton.

Eight days after the first visit (April 30th), we washed the cavity well, found the pulp as healthy as if freshly exposed, capped with a chloroform solution of balsam and a bit of paper, and then filled the cavity of decay with Worff's cement. Slight pain followed.

About a week later (May 7th), the lady called to report that after she had left the office, April 30th, this tooth, together with the one to be mentioned hereafter, ached fearfully; in fact, so intense was the pain, that to rid herself of it she imbibed a goodly quantity of "How came you so?"—which we are happy to state had the desired effect.

On February 18th, 1874, the lady called, by request, and permitted the removal of the filling. The pulp had made little progress in dentine formation; but that about which we were most concerned, the *vitality* of the pulp, was beyond question. It gave no pain on the removal of the filling; had the appearance of health; and responded as the normal pulp invariably does, when mechanically interfered with. We re-covered the exposed portion with the chloroform solution of balsam, this with paper, and both with Worff's cement. No pain.

CASE III. This tooth, which was in the same mouth as that last mentioned, was the second left superior bicuspid, the pulp of which was fully exposed, a large portion of it gone, and much of the pulp-chamber filled with a slate-coloured deposit, the nature of which we could not determine. This case, it should have been stated, presented April 22nd, 1873. After the usual preliminaries we introduced pepsin saturated with hydrochloric acid, then covered with paper and sandarac on cotton.

Three days later (April 25th), we repeated the above treatment.

April 30th we found a little of the slate-coloured deposit still in place, and concluded to let it remain; covered the pulp with chloroform solution of balsam, paper, and Worff's cement. No pain of any account.

One week ago (Feb. 18th, 1874), we removed the filling, found the opening into the pulp-chamber reduced in size, the pulp alive and in the performance of its proper duties. We capped as in the first operation, with balsam, paper, and Worff's cement. No unfavourable symptoms.

Three days later (Feb. 21st), the lady reported that she had had a repetition of the trouble of ten months before. Aside from this, everything pointed to success.

In the above cases we used pepsin in water, in glycerin, and in hydrochloric acid. These preparations were invariably covered with a bit of stiff paper, to prevent the objectionable action of the solvent of the gum sandarac. In some instances we used cotton, in others sandarac on cotton, in others still gutta-percha, to retain the pepsin and paper in place. In these matters we too frequently consulted convenience. Now, when about to treat a pulp more or less of which has been set aside by the sloughing process, we make a paste of Sheffer's saccharated pepsin and hydrochloric acid, cover this first with a bit of paper, then both with wax or gutta percha. When the pulp is in good condition, we load a bit of heavy paper with a stiff chloroform solution of Canada balsam (a method which we believe originated with Dr. C. E. Francis, of New York), and adapt it to the portion exposed. This cap we cover with Worff's cement, and let it remain until conditions are such as to admit of a metallic or other permanent filling.

We confess that we did expect to see a greater amount of bone formation in both cases II. and III.; and that we were disappointed must be attributed to the uniformly poor health of the patient. That the pulps continue to live and perform their functions, in the first case for seven (7) months, in the second and third for ten (10) months, is sufficient to establish in our mind the certainty of saving a large proportion of the *partial* pulps that present from time to time for treatment.

The dentist often meets with cases in which the dentine within the crown of the tooth is destitute of its mineral elements, and of such consistency that it can be neither cut nor scraped, with any degree of satisfaction, without risk of exposure of the pulp by the removal of more tissue than is desirable. The molar teeth are found in this condition oftener, perhaps, than any other, and are generally so frail as to admit of plastic fillings only. In such cases we have found the pepsin paste to answer a good purpose. It may be necessary to use it in large quantities, and to make several applications; but the painless removal of the dead dentine is only a question of time.

If our memory serves us rightly, pepsin has been used by some in alveolar abcess. It might answer well where there is a fistulous opening; but other remedies, much more efficient and of easier application, preclude its use for this purpose.—*Dental Cosmos.*

DECAY OF TEETH DURING PREGNANCY.

(JOHNSTON'S DENTAL MISCELLANY, JUNE, 1874).

The very rapid decay of the teeth of females during pregnancy, is a condition that has long been observed by both physicians and dentists, but the *cause* of this condition of these important organs has not been accounted for by writers on the diseases of the teeth, or those on the diseases of the system generally. Its pathology appears to be among the unrevealed phenomena, so far as the writer is aware, not having met in his professional reading any theory fully accounting for the very general state of decay found in these organs, and as a consequence, the very frequent extraction rendered necessary during the period of gestation. There may be a more *active* connection of the nervous system of the uterus with the dental nerves, and that condition may account for the *ache* at this particular period, but the question of *cause* is still in abeyance.

In a paper read before the South Carolina State Dental Association, in June, 1873, the subject was referred to, and the hypothesis suggested, "that the decay may be caused by the demand on the osseous system of the parent, for the constituents for the formation of the bony structure of the embryo being, and the blood not furnishing the requisite supply, the teeth being more highly endowed with the phosphates than the other portions of the system, were drawn upon to supply the deficiency. Yielding a large portion of their constituents, they were deprived of the ability to resist the destructive influence of the vitiated fluids of the oral cavity (which are doubtless more vitiated at this period), and consequently decay more rapidly."

The foregoing appears as near a theory for the decay of the teeth at the period named, as any other that the writer has known to be offered to account for this disease of the teeth. It may be decidedly objectionable in a scientific point of view, but the subject is one full of interest to the profession, and of especial importance to all those females who are "as ladies wish to be who love their lords," although the interesting condition may necessitate them to "the loss of a tooth for a child."

Quite recently the writer observed in Johnston's DENTAL

MISCELLANY, reference to some remarks by Dr. Hawes, of Boston, before the Massachusetts Dental Society on this question. The Doctor stated as his opinion, "that the decay is traceable to inter-uterine disturbances. The abnormal condition of the pelvic organs of the female, acting through the digestion, was the cause of the marked decay of the teeth in females during pregnancy." Whether this or the previous hypothesis touches the true cause is a question that may well entertain the time and the talents of the profession in the numerous Dental Associations of the country, and the Schools of Education.

As this is a very progressive age, and as I have not been well posted in the professional publications of the day, I may be mooting a point already in a measure settled. It will be gratifying to learn that such is the case.

M. B.

Camden, S. C.

AMALGAMS.

By E. A. BOGUE, M. D.

As read before the New York Odontological Society.

(JOHNSTON'S DENTAL MISCELLANY.)

THE physical properties of amalgams are as yet but little understood; and we are glad to know that experiments upon them are now being made, both here and in England, which, we trust, will result in valuable additions to our knowledge.

Meanwhile, for information on this subject, we are obliged to rely mainly upon Watt's Chemical Dictionary; and for information concerning amalgams for dental use, we are largely indebted to Messrs. Tomes and Fletcher, of England, and Cutler and Beers, of America.

The alloys for dental amalgams are various. Though mostly compounded of silver and tin, yet gold, platinum, palladium, cadmium, antimony, and copper have been sparingly used.

Some of these metals combine with mercury easily; others with difficulty.

Among the former are silver, gold, tin and cadmium. Among the latter, copper, palladium and platinum.

It may be well to observe, in passing, that copper com-

bines with mercury by being precipitated upon it; palladium readily, even violently, assimilates with it, when in form of a precipitate, though very slowly in any other form; and platinum enters into combination as platinium sponge, or in some alloys, though Dr. Cutler (*Can. Jour. Den. Sc.*, 1871, p. 324), is not aware that this metal can amalgamate with mercury.

As to the character of these amalgams:

The copper amalgam, which is quite difficult to prepare, is dark in color, and its oxide is poisonous. Though extensively used in Germany, it is fortunately seldom or never employed in this country.

The palladium amalgam is quite as black as the copper, and cannot be used except in the form of a precipitate; but it is not liable to more than superficial oxidation, and that entirely innoxious.

While most metals combined with mercury are supposed to constitute merely mechanical admixtures or solutions, palladium forms a true chemical union attended by the evolution of heat.

This amalgam is very highly esteemed in certain quarters in England; but its costliness, blackness and brittleness, however, prevent its being generally adopted.

The amalgams which have been most in favor in this country, have been, until within a few years past, composed principally of silver and tin.

Among these, however, are some that exhibit traces of other metals; such as Townsend's and Lawrence's, and perhaps a few others, which contain the copper that enters into the composition of the coin silver they use, and Holme's, which contains a small proportion of gold that is added to diminish the shrinkage.

Recently, through the researches of Messrs. Fletcher and Tomes, a new amalgam alloy has been introduced, which is composed of gold, platinum, silver and tin. The office of the silver is to harden; of the gold, to lessen contraction and oxidation; of the platinum, to hasten the setting and preserve the color. All these are essential points, and more essential in England, perhaps, than elsewhere, because an amalgam filling there, as a rule, receives its entire finish at the time of its insertion.

This filling hardens more rapidly than any other which has been in common use; and its contraction is less than

that of any other *compound* filling whose contractions have been accurately measured.

As to the shrinkage: It has been thought by some, that the action of certain amalgams in the toooth, drawing together and rising toward the centre, was indicative of expansion. But it may be accounted for by the tendency of some metals to assume the form of a spheriod; and the amalgams which harden most slowly are especially inclined to this shape.

Besides, the experiments which have been made upon amalgams by the specific gravity test, have exhibited marked shrinkage.

According to a paper read by Mr. Tomes, before the Odontological Society of Great Britain, March 4th, 1872, the variation is from .037 of a unit in the case of palladium to .38 of a unit in the case of tin and silver used in equal parts; the shrinkage amounting to ten times more in the latter case than in the former.

The shrinkage of copper also is very little—scarcely greater than that of palladium.

It has been claimed, however, that the specific gravity test is not sufficiently accurate to measure the shrinkage of these substances; but a mechanical apparatus, constructed for the purpose of testing the very minute expansion and contraction of bodies, furnishes substantially the same results.

We wish now to speak of the practical use of amalgams. It is the general practice to combine the alloy with an excess of mercury; afterwards squeezing out the surplus mercury with the fingers or a pair of pliers.

As it is impossible to get rid of the mercury by this operation, since about twice the necessary quantity remains, leaving the amalgam hard and unworkable; the only proper course is to use the exact proportion necessary to the combination. Should a surplus of mercury at any time be found on the surface of an amalgam filling when the packing is finished, it can be tolerably well absorbed by slices of crystal gold, cut thin with a razor and laid upon the dry surface of the filling, until they are white with the mercury—when they are removed.

Dr. Cutler, in his experiments, took twenty-four grains of amalgam, whose composition is not given, and having mixed, pressed, washed and weighed in the usual way,

found that thirteen grains of mercury had been retained. Further on, in the same article, he states that twenty-four grains of coin fillings took up thirty-two grains of mercury.

A red heat for twenty minutes drove off nearly all the mercury, but did not soften the lump, which remained hard and firm, though somewhat brittle. In these cases the proportions are not correct.

Now, if chemically pure silver and tin be combined in atomic proportions, silver 108, tin 118 (*vide* Fletcher on Amalgams—*Brit. Jour.*, 1872, p. 89), twenty-four grains of the clean filings mixed with seven grains of mercury "will result in a powder, adhesive under pressure, which will not dissolve in alcohol, and therefore needs no washing, and which will weld up as solid as a coin.

"This is a true amalgam, containing no free mercury; in fact, there is great difficulty in separating a trace of mercury below a red heat." But, of course, it is impossible to use a powder in the majority of cases.

But there is a filling which it is practicable to use in almost all circumstances, viz: the ordinary silver and tin amalgam mentioned above, with the addition of ten per cent. of fine gold and sufficient platinum to insure rapid setting.

If to twelve grains of alloy four or five grains of mercury be added, and the resulting compound be carefully packed, without washing, into the cavity, little by little, with small points, warmed, if necessary, and finished up by repeated burnishing, the result will be a more perfect filling than can be procured by ordinary means, and that, too, with a compound containing little or no free mercury.

From what has been said, it will be seen that the term amalgam has been applied indiscriminately to almost all sorts of compounds; more than two hundred of which have been tested in order to ascertain their physical properties and adaptability to dental purposes. And it is desirable, in the circumstances, that much more should be known in regard to these compounds, before they be generally adopted or rejected by the profession.

DYSPEPSIA RELIEVED BY OBVIATING THE CAUSE.

(British Medical Journal).

M. G., aged 26, single, was first seen on January 7th, 1874. She complained of severe pain in the right hypochondrium and epigastrium, occurring in paroxysms, at times so severe that she hardly knew how to endure herself. It was always worse after eating; in fact, she was afraid to make a meal, lest a paroxysm should be induced. She was troubled much with flatulence. The bowels were very confined. She had passed blood *per rectum* during the last nine months. Her apetite was small and very capricious. The catamenia were regular, but scanty. She was emaciated. The urine was reported to be thick and high coloured. As the majority of the symptoms had existed for many years, and various medicines had been taken with no beneficial result, it was evidently no ordinary case of dyspepsia. The chest and abdomen were examined carefully, but no trace of disease was detected beyond some slight tenderness over the epigastrium, and some slight dulness at the apex of the right lung. On requesting to see the tongue, which was furred, I noticed that the teeth were much decayed; and, on examining these more closely, I found that no two of the molars opposed each other; there was, in fact, no proper masticating surface, and this seemed quite sufficient to account for the symptoms present. The patient was urged at once to see her dentist, and have the defect remedied. In the meantime, some pepsine wine, with tincture of capsicum and dilute nitric acid, was ordered, and extreme carefulness in diet enjoined. Artificial teeth were inserted in due time, and since then the patient has had no return of her former symptoms. She is now stouter and much healthier in appearance; the bowels are more regular; there has been no recurrence of the hæmorrhage, and the condition generally is one of most marked improvement. She says herself "she has never felt so well in her life; nothing ails her now; she can eat and drink anything."

I have thought the case worthy of record, for I have met with many others where the *Pharmacopœia* has been exhausted in vain—the cause of the malady never having been detected, or even suspected. The narration of this may serve to put others on their guard in dealing with these tedious and troublesome cases.

ARTHUR W. EDIS, M.D.,
Assistant Obstetric Physician, Middlesex Hospital.

ELECTRO-MAGNETIC MALLET.

By W. G. A. Bonwill, Philadelphia.

Read before the Susquehanna Dental Association, May 14th, 1874.

(pennsylvania journal of dental science.)

Mr. President and Gentlemen of the Susquehanna Dental Association: At your invitation to clinic for you with the Electro-Magnetic Mallet, I am here, and will endeavour to respond to your desire in such a manner as will, I trust, prove of some value to you in the future.

I have not come to show off any magnificent filling of artistic contour, unlike what any or all of you are able to do, but in a simple manner to explain the instrument and its use, with which my name has been associated these four years. I do not feel vain when I say, that if any one has a right to speak upon this subject I have. Never was an intimacy more complete between husband and wife; or love purer for any idol than that held by me for this instrument. For five years, particularly, not a day has passed but it has been the subject for renewed thought, as to how I should make it more complete, not for myself only, but for the profession. Never for a moment have I aimed to make it a burthen upon any one. In the future, when prejudice and envy shall have died away, and my brethren have learned to look charitably upon me, and view an instrument which is now so little known and understood, well do I know the love they will bear it, if not its inventor.

I spread out before you several models, showing the successive steps taken to bring it to its present perfection. You must see what labor of brain, of patient and untiring energy, it has taken to work out the problem first conceived eight years ago. No one who is not an inventor can form any just idea of the cost to me, while in full practice, to carry on the enterprise. I thought I had reached the ultimate when I had perfected this—No. 1. But no sooner had this been seized, and the credit given to others, than necessity brought forth another child—No. 2. This seemed all that heart could desire, as you would suppose, by reading the testimonials of our leading dentists. But alas! eighteen months of vigorous infancy, which was apparently adult life, found it the subject of a bastard rival claiming to have done in three short months

more than five years of toil on my part had completed. I need but refer you to the common illustration of Columbus and the egg.

The next step made was this—No. 3, which in one short night, between 12 and 3 o'clock a.m., was conceived and born, and three weeks matured it. As to its simplicity and positiveness I need not say a word. Comparison with the others will soon tell the tale.

I now know, gentlemen, that it is next to impossible to make it of a less number of pieces. All inventions, when first completed, are of necessity complicated. Use and constant association causes you to cut off, one by one, this lever, that screw, and many other parts, and finally the triumph of mechanism comes in its greatest simplicity from the fewest number of parts. I believe I have it.

At the last meeting of the Alumni Association of the Pennsylvania Dental College, I placed before them a proposition whereby the dental profession can have control of it, as well as all other patents or improvements, and fix their own price thereon, so that neither the inventor will be cheated of the honor or emoluments, nor the profession encumbered with worthless devices, or high tariffs for the same. It would be utterly useless for me to give you such an instrument free for you to make or have made, without some one to oversee its manufacture and be responsible for its completion. Some one must have it in hand. If my brethren do not wish me to do so, I am perfectly willing they shall individually try it. The task is Herculean, and I do not covet it. Private practice pays better. But for the sake of my own credit I would, if backed by the profession, see that they get not only a perfect, but a cheap instrument; so cheap as to place it in the hands of all. I have no desire to withhold it from you. I have placed it at the disposal of the dental world: let them do me justice or not, I abide by their decision.

Without further preliminary remarks, I hasten to speak of its advantages, as I believe, over all other devices for filling. For the picayune sum of twenty-five cents per week it performs nearly all the physical labor of hand-pressure and relieves the brain of that constant tension, ever present by other modes, to guard and make effective the point of the instrument.

It will do in one hour what cannot be done by hand or

by the ordinary processes in less than from three to four hours.

It impacts at least one-sixth more foil into a given space than by any other process. Have packed two books of Abbey's adhesive in one tooth in seventy-five minutes. From the great rapidity of the blows, and the sharp, quick stroke of the mallet, the patient is not cognizant of each blow, and rests more pleasantly under it than any other mode of packing.

The great reduction in time gives the patient an endless amount of comfort and allows them to rest easy under the operation.

An item of expense saved also is of no mean consideration to the patient, while there is an equal gain to the operator.

The mammoth fillings hitherto dreaded become pleasant pastime and no task.

One of its greatest advantages is its effect upon the surrounding tissues. It might be supposed that from the great number of strokes the parts would become so inflamed that the operation could not be completed without great pain. Not so; but the reverse. The sharp, quick blows, with the tool moving forward not more than one-fiftieth of an inch, are expended entirely in the packing of the gold, and very little is allowed to pass. A slow, heavy mallet carries the tooth with it, and much of the power of the blow is lost in the moving of the tooth in its socket. One hour is long enough for the longest operations—with few exceptions.

If one's practice is small and he can do all that is to be done in four hours of each day, well; so much the more time for brain labour, and the reflection of having more thoroughly done your duty.

I repeat what I have so often said, that were it never to pass out of my office I feel amply repaid for my trouble, in the satisfaction given me every hour of the day. Without vanity, I thank God for it every time I take it into my hand.

My great desire, however, is that dentists shall look upon it as their best friend, and remember that there are no high tariffs hanging about it.

I would much rather have myself ignored than that the profession should be blinded and deprive themselves through prejudice of what has been to me my bread, my life.

Every invention of any value to mankind has had to pass just such a gauntlet as has this humble production. If what I have done does not meet the demands of the profession, I pray that some of you will take up the subject and advance it. I feel that I can do no more. What the future may develope I cannot now divine. I cannot feel like a few in our city, that machinery is going to rob the profession of its science, and reduce it to a mere art.

He who would drive from us the machinery necessary to the present practice of our calling, must produce or inaugurate some means whereby caries will be permanently anticipated, leaving nothing but the diseases of the mouth to give us the distinction of the oral surgeons. That day I see near at hand, and in another article, which I ask permission to read, shall portray the future of dentistry.

Without taking more of your valuable time on this subject, I can better illustrate my position by actual demonstration upon the bony subject. We will proceed to clinic.

THE HARRIS DENTAL ASSOCIATION.

PENNSYLVANIAL JOURNAL OE DENTAL SCIENCE.

THE seventh annual meeting of the Harris Dental Association of Lancaster was held at the office of Dr. M. H. Webb on Thursday, May 7, 1874.

In the afternoon session the society was entertained and greatly benefited in witnessing a clinic with the electro-magnetic mallet, by the inventor of the instrument, Dr. Bonwill, of Philadelphia. It was one of his improved instuments, and the beauty and perfection of the operation, together with the incredibly short space of time it required io insert a large compound filling, proved it to be everything that can be desired for such work. He also exhibited and explained the use of his diamond-pointed drill or reamer and hard rubber corundum disks, with the following remarks :

DR. BONWILL said : The use of the diamond in the permanent separation of the incisors, superior and inferior, and the hard rubber corundum disks for the bicuspids and molars, will now form the subject of greatest vital importance.

To restore to nature by art that which has been lost, and,

as in the teeth, the members made useful for a longer period, is a task of which any of us may feel proud. But, to anticipate the tooth of time and make restoration unnecessary is by far a prouder task, and when performed, will elevate the profession to a much higher standard.

What are we doing to-day to rid the world of the ravage of decay in the human teeth? Have we done one thing to stay its progress?

Are we doing for our patient all that we are conscious is our duty in lessening the great number of fillings, and the greater number of artificial dentures? I say, in all good faith, no! no!

Many have, on a small scale, so acted, but the means hitherto at our hands have been inadequate to the end. It is my pleasure to demonstrate to you to-day that we have at our doors the coveted instruments whereby we can say to that insidious sapper, "thus far shalt thou go and no farther."

The old way of separating teeth, by file and chisel, was bad enough to practice when actually demanded, where decay was present, and *filling* necessary, but to use them on the approximal surface of every tooth to anticipate decay, was too barbarous. But few would permit it. As a fixed practice it could not be done, and when done could not be fully relied upon from the impossibility of separating sufficiently at the cervical walls, and even when done, of placing such a smooth surface thereon as would prevent decay without constant attention.

What have been the steps taken to take the place of the file and chisel?

I think I am safe in saying that the first disk ever given to the profession was a steel file of one inch diameter, recommended to those who bought my *drill*, the first foot-engine in the market, though not the first patented. Upon this Dr. Arthur's shellac and corundum disks came forth, which, if there were nothing more permanent, are nearly all that we could desire.

When hard rubber plates first came out I made of rubber and emory separating files, instead of steel, whereby I could cut tooth substances or dress up fillings. For want of proper means of mixing rubber and emory I abandoned it. This old idea is now reproduced, and this disk, which I show you, has been the result. With these it becomes an

easy and inexpensive task to separate every back tooth, and so perfectly, that decay can be anticipated on every approximal surface, if done as soon as the permanent teeth have arranged themselves in the arch. Do not wait a day; for delays are dangerous.

The pain is comparatively nothing, and the inconvenience to the patient is of no consideration. The time consumed is not worth estimating. The hardest teeth can be separated in three minutes.

Their great strength with their thinness and delicacy are as ten to one to shellac, and no fear need be entertained of doing injury to the mouth when run at 4,000 revolutions per minute. It is the work of but a few moments in removing decay where superficial, or, which is better still, to separate before decay has begun. Every one knows that at least ninety per cent. of the cases coming under their care every approximal surface, or nearly all, have to be filled by the time they arrive at the age of thirty. The majority sooner.

When separated, while the tooth structure is yet sound, the division is not wide, and such a solid shoulder or abutment can be left that not only prevents any closer approach, but is never a source of annoyance to the patient as when left to decay and then fill, and in quite every case no solid cervix is left to bear the pressure. By this means we can prevent every approximal surface from further decay, and save immensely in every way to the public.

But the disk will not separate more than the bicusps and molars. What have we for completing the arch?

I present to you to-day the diamond-pointed *reamer*, with a permanent steel back-action for the specific purpose of separating from the palatal side of the superiors and lingual side of inferior incisors all their proximal surfaces. The superiors I separate whether decay is present or not. The inferiors never unless decay is present.

The operation is done entirely from the inside of the mouth, and such a groove is made in the short space of five minutes as not only removes all predisposition to caries, but the division is not seen from the labial surface other than a mere trifle. The entire beauty of the tooth is preserved without any danger from future decay. The most perfect division is made that is possible for any other point to make but that made by a three or five angled diamond

pyramid point. It is the thing for a specific purpose, and with its conscientious use, with that of the hard rubber corundum disk, there need not be an artificial denture from caries alone. If we wait a wider division, one or more fillings are required, and probably refilling in a few years, with all the annoyance of food pressing upon the gums.

My plan is to commence with children at three years of age, or as soon as the temporary are in place, and separate every proximal surface with the disk, front and all, except the inferior incisors. Sometimes use the diamond reamer on front teeth. Principally the disk for children. Do not wait until the first permanent molars appear. It is too late to do so perfectly. Then by filling the grinding surfaces, as well as any other places that could not be cut out, we are sure of their temporary teeth. When the permanent take their place I at once make the disk and diamond reamer do their work.

My experience of twenty years confirms me in the assurance that I am performing a more noble and lasting work than by waiting, and having to restore by filling. No one can deny the facts that every day stare us in the face, that if we would have the greatest number of human teeth preserved we must resort to this wholesale treatment. The experience of the old dentists confirms me that I am right, and not a day passes but I see the wisdom of such a policy. In some cases it seemed almost like sacrilege to cut beautiful teeth, but in scores of cases, where I least suspected decay being present, I have found it deeply seated. By no other means could it have been detected.

I have yet to regret the first case where this simple treatment has been maintained. I repeat, instead of waiting for the first molars to appear, commence by dividing every temporary tooth, except inferior incisors, and you have done the best work, that of anticipation. By all means preserve the deciduous by dividing and filling with even ordinary tin foil when needed. Until these means were at my hands I would not have undertaken such Herculean labor, nor would I have subjected my patients to the pain incident thereto, but with these it is but the work of a moment, and a labor that not only pays the patient but the operator, and endows a clean conscience that preservation is nobler than restoration.

A vote of thanks was tendered to Dr. Bonwill for his instructive clinic, and interesting remarks, and after a very pleasant and profitable meeting the society adjourned to meet at the office of Dr. J. A. Martin, Strasburg, Lancaster county, Pa., on August 13th, 1874.

S. WELCHENS, Secretary.

A CASE IN PRACTICE.

BY JOHN S. MARSHALL.

(Johnston's Dental Miscellany.)

In the January number of the *Dental Cosmos* for 1872, under the head of "Clinical Reports, by Dr. James E. Garretson," a case of neuralgia, dependent upon granules of Osteo-Dentine, was given. The rarity of this disease has led me to send the history of a somewhat similar case in my own practice.

Mrs. B——, aged 27, came to my office a few months ago for treatment. She was afflicted with severe neuralgia in the left side of the face, and of several weeks' standing. Upon examination I found that the left central incisor had been filled from the anterior approximal surface, but by an accident a portion of the tooth had been broken away, carrying the filling with it, and leaving a large dishing cavity.

The tooth was quite sensitive, but there was no exposure of the pulp. Upon percussion the patient would flinch a little, though she declared the tooth was not sore, but to use her own expression, "it seemed big." Not knowing just the cause of the difficulty, or how to treat the case at the time, I filled the cavity with Hill's stopping, and told her to call again in a few days. Two days after, she returned, the pain was no better, and, if any difference, a little more severe.

After a second careful examination, I concluded to apply arsenic in the usual manner, to destroy the pulp, feeling sure the trouble lay in that organ, but in what form I was unable to say.

The next day she returned, saying the pain had entirely ceased, and upon extirpating the pulp a few days later, I found, at the bottom of the pulp cavity (nearest the cut-

ting end of the tooth), a little granule of Osteo-Dentine, about the size of a pin-head, pear-shaped in form, and having a semi-transparent appearance. I afterwards filled the pulp cavity and tooth with gold, and up to the present time it has given no further trouble.

Syracuse, N. Y.

NEW INVENTIONS.

IMPROVED MORRISON DENTAL ENGINE.

We are very glad to receive from Mr. Rutterford, of Poland Street, a woodcut and description of the Improved Morrison Engine. In order that our readers may fully realise the advantages of the new Engine we reprint the cut of the first one brought out.

Description.

1st. The rocking movement of the upright standard is abandoned, and a rigid, handsomely plated, and tapering column substituted.

2nd. From the top of this column extends an arm directly in front of the patient. This arm swivels upon the column, and is adjustable vertically, being secured by a brace at any height desired, thus bringing its end directly in front of the patient's mouth, whatever be the height of the operating chair.

3rd. Attached to the end of the adjustable arm by a most ingenious universal joint, is a shaft about twelve inches long (corresponding to the extension arm of the old engine), which carries at its end the handpiece.

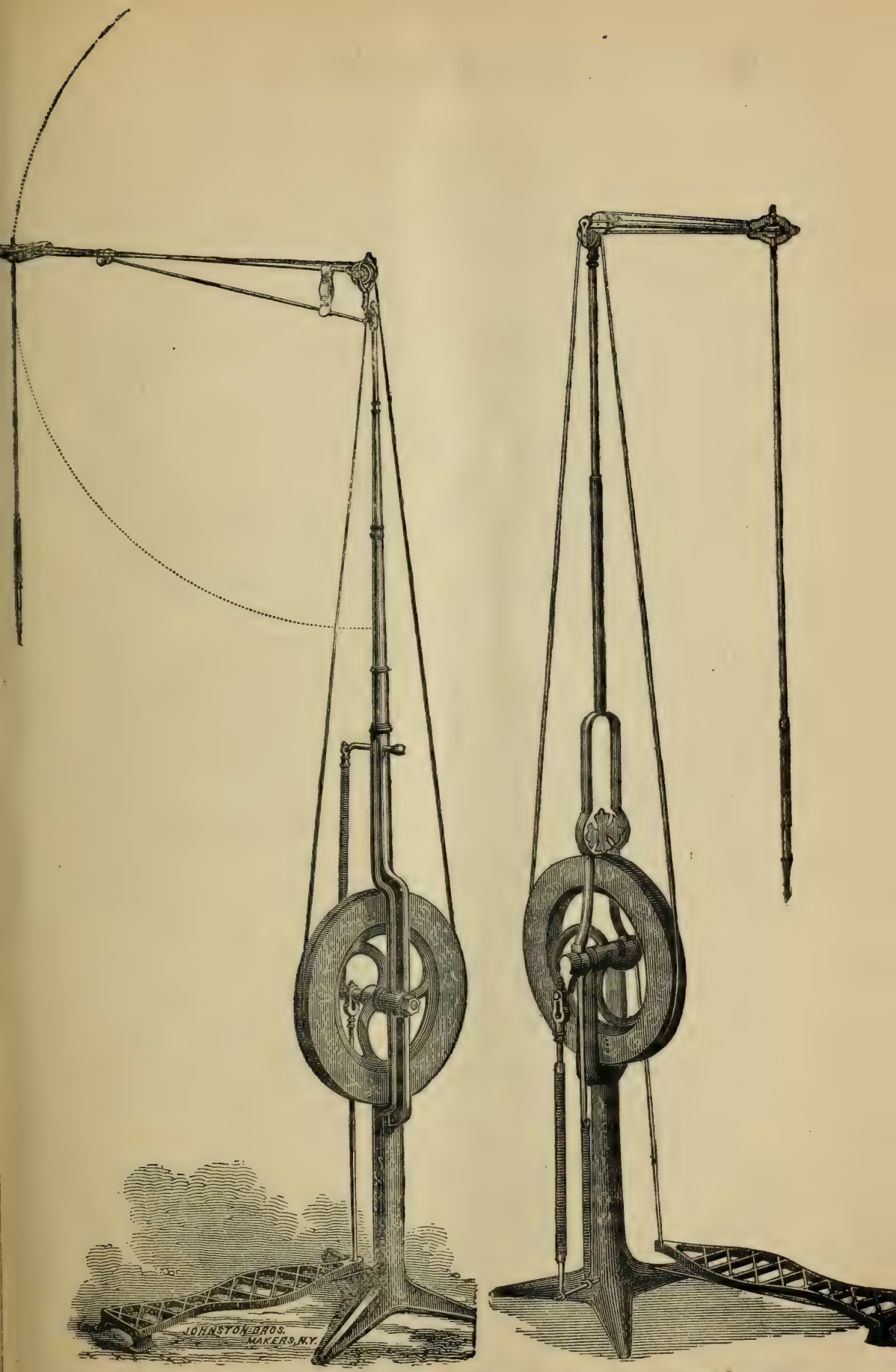
a. This shaft, being short, is much lighter than the old one, enabling the operator more perfectly to feel his work, and is also less to tremor.

b. Both sides of the mouth may be reached without changing the position of the engine.

c. By lowering or raising the adjustable arm, according as the operation is upon the superior or inferior teeth, the driving spring is but slightly flexed, and great steadiness secured.

4th. The off-centre spring is attached above the driving wheel, partially supporting it and reducing the friction.

5th. The handpiece is much smaller, and the burs so secured that they may revolve in either direction, and at the same time be used either with a pushing or pulling cut, and this without the use of a catch spring. Old style burs can be refitted to this handpiece.



IMPROVED MORRISON ENGINE. Price, 60 Dollars. Attachment Extra.

DENTAL PATENTS.

[*The Dental Advertiser.*]

[*Under this head we publish, as items of news, the names and claims of all patents, relating to Dentistry, issued for the quarter preceding the publication of this Journal.*]

146,380—Jan. 13, 1874.—DENTAL PLUGGER.—George H. Chance, Salem. Oreg.

The finishing and plugging tools are furnished with gold points. When the point of the instrument is abraided in use it leaves particles of gold upon the filling instead of iron or steel.

Claim.—A gold-pointed plugger, or analogous dental instrument, substantially as described.

146,587—Jan. 20, 1874.—DENTAL IMPRESSION CUP.—George Shindler Touke, Westminster, Md.

The ordinary dental impression-cup having apertures that expose the sides of the aveolar arch, and allow direct lateral manipulation upon a flexible lining which covers the interior and retains the plaster.

Claim.—The combination, with an impression-cup having apertures B, of a flexible inside lining, C, as and for the purpose specified.

146,730—Jan. 20, 1874.—COMBINED INHALER AND DENTAL PROP.—John H. Vickers, Norwich, Conn.

The central part of this mouth piece of an inhaler is hollow, and carries a plug with an opening through its centre to permit the entrance of the gas. After the inhaler is removed, this plug remains in the mouth to prop it open while the operation is performed. The plug also carries a spring to pass under the chin.

Claim.—1. The prop B, in combination with the mouth-piece A A, when constructed substantially as and for the purposes hereinbefore set forth.

2. The spring I with its plate H, in combination with the prop B, substantially as and for the purposes hereinbefore set forth.

(To be continued.)

APPOINTMENTS.

ARTHUR R. PHILLIPS, Esq., L.D.S., R.C.S., to be Dental Surgeon to the North London Hospital for Consumption, at Mount Vernon, Hampstead.

W. GILL RANGER, M.R.C.S.E., to be Assistant-Dental Surgeon to St. Thomas's Hospital.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.

Mr. John Bernard Magor passed the Preliminary Examination for the Diploma of Fellow of this College, on the 23rd, 24th, and 25th, June 1874.

In addition to the subjects included in Part I. of the Examination; he acquitted himself satisfactorily in the following subjects in Part II. thereof, viz:—Greek, French and Chemistry.

REVIEW.

"A REBUKE."

UNDER the above portentious title, one Dr. Ingersoll objects, or as he would have it, replies, in the pages of *The Missouri Dental Journal*, to certain criticisms which I had occasion to pass upon an article by Dr. Chase in the "Transactions of the American Dental Association"; his objections would have passed unnoticed were it not that I have as strong a dislike to anything like reckless criticism as that which he expresses.

Whether the object of his sympathy will greatly thank him for giving to my strictures a wider circulation than they would otherwise have attained, is a matter between the two gentlemen themselves; for my own part, had my criticisms been in any way invalidated, I would have gladly retracted them, as it is however, they receive a fuller justification from the exceeding weakness of the defence raised against them. The charge made against Dr. Chase's paper was, that it was diffuse, theoretical, and without the smallest solid basis of observation to rest upon; a condemnation which is justified by his advancing startling theories on the subject of absorption without any adequate supporting evidence.

Before an author is justified in publishing improbable theories, it is his duty to state, with scientific accuracy, his facts, the premises of his argument. Dr. Chase advances a startling theory. What sort of evidence in the way of fact can his apologist find?

"Some of the most careful observers declare they have known in their experience." Who are the careful observers? When and where were their experiences recorded? How have they "known"? Again, "a large number of intelligent men are quite sure, from a great number of observations." How many? Who are they? How are we to know they are intelligent observers? On what evidence did they become "quite sure?" Where did they record

"a large number of observations"? Were the observations microscopic? if not, of what nature? This is not the sort of evidence to prove a scientific point, and vague general impressions are not observations worthy of the name. The point is surely remarkable enough for the "observations" to have been carefully followed up and put on record; if any such exist, why are they not quoted, chapter and verse?

If Dr. Ingersoll is still at a loss to understand what I mean by theorising diffuseness, let me illustrate it from a recent paper of his own, "A Plea for the Peridental Membrane."—(*Dental Cosmos*, July, 1874.)

Recent writers of authority for the most part agree that there is no such membrane, distinct from the periosteum of the socket. Let us see how Dr. Ingersoll set to work to prove his point.

One might expect he would commence by examining sections of the parts in *situ*, and demonstrate microscopically its existence, or, at least, tracing out its history, show that it was, from a developmental point of view, distinct.

But our author takes no such matter-of-fact course; "pleading," not demonstration by observation, is his manner of proof; and to his paper also attaches the stigma that there is no sound basis of observation.

As an instance of the loose inaccurate expressions in which the paper abounds, he tells us that "the peridentium is identical with the *lining membrane* of the pulp chamber." What does it mean? The only thing which by a stretch of language, could be called the "lining membrane" is the membrana eboris or layer of odontoblast cells, and does our author mean to tell us that the peridentium is identical with the odontoblast layer? If his words mean anything, they mean that.

To put the matter in a few words, the question is as to the existence or non-existence of a thing, the presence or absence of which can be demonstrated by any competent histologist; not only can be, but has been over and over again.

The case is a matter for observation pure and simple, not for argument; it is there or it is not, and all the talking in the world is not worth so much as five minutes of observation. Dr. Ingersoll does not so much as allude to the

microscope, does not pretend to have seen the peridentium, but instead, gives two pages of his reflections, evolved out of his inner consciousness, as to the probability of its existence.

In fact the "plea" for the peridentium is just about as conclusive as the "plea" that Dr. Chase has followed a true scientific method in his paper; the sound, solid work of science is not to be done by pleading; theory must follow upon observation, not precede it.

That Dr. Ingersoll should fail to see the justice of my criticism of Dr. Chase's paper is no matter for surprise, seeing that his own style of work is open to similar condemnation; it may seem dull, plodding work to observe and merely record your observations without giving rein to that disposition to theorise and moralise which seems inherent in man's nature, but that is the way to advance science.

If I may venture to give a word of advice to our authors it would be to observe, observe, observe; and when you have observed, record your observations with the utmost care and fidelity; theorising, save when in the hands of a master and based upon an immense number of observations, is not worth the paper on which it is written.

I am, Sir,
The Reviewer of the Transactions of the
American Dental Association.

LONDON DENTAL HOSPITAL.

CASES TREATED FROM JULY 1ST TO 31ST, 1874.

Extractions. Children under 14	350
Adults	578
Under Nitrous Oxide	243
Gold Stoppings	204
White Foil ditto	117
Plastic ditto	213
Irregularities of the Teeth treated surgically and mechanically	30
Miscellaneous Cases	201
Advice Cases	30
Total	1966

ASHLEY GIBBINGS, *House Surgeon.*

CORRESPONDENCE.

THREATENED DEATH FROM NITROUS OXIDE.

SIR,—As much may be learned by failure as by success; and there are especial reasons for asking you to permit me to record in your JOURNAL a recent case, in which I nearly lost a patient under the influence of nitrous oxide gas.

The patient was a lady about thirty years of age, and with all the outward signs of health. The gas was administered by a well known hospital surgeon. After a few inspirations, before she was unconscious, her pulse, which was under my fingers, entirely ceased to beat, while simultaneously her breathing stopped. In fact, she seemed dead, and we both exclaimed, 'She is gone." Her tongue was pulled forward, and she was placed upon the floor, when we at once resorted to artificial respiration, as we then thought, with but little chance of restoration. Fortunately, our efforts were crowned with success, and in a few minutes there was a slight inspiration, after which breathing became gradually normal, though the patient did not recover consciousness for nearly half an hour. I have often seen unpleasant symptoms during the administration of nitrous oxide gas, but this is the worst case which I have met with.

Now for the *morale* to be deduced from this experience. Gas has been responsible for some few accidents in England, and for more in America, where it is sometimes administered very incautiously; but, as a rule, this anæsthetic is generally held to be *sine periculo;* and, acting on this assumption, it is too often given by those, who not being surgeons, unwittingly take a great risk upon themselves. It is for the benefit of these gentlemen that I bring forward this case; for I know that men who are not members of the College of Surgeons are daily in the habit of administering this anæsthetic to their patients, and I have even heard of the services of a wife being called into requisition on such occasions—a story showing such a lack of professional dignity, that I would willingly assume it to be untrue However, I know that it is commonly given by men lacking any surgical or medical qualification—even by men who do not possess the dental diploma of the College. Of course, such men act at their own risk; but I think it is only fair to place the fact before them, that they incur the hazard of placing themselves in a very unpleasant predicament, should anything untoward occur, for they would find it hard to persuade any jury that they were free from blame.

I have also heard of duly qualified men permitting others who are not qualified to administer anæsthetics whilst they operate. The evil here is, that the patient does not understand that the person called in to assist merely acts under the guidance of the operator, and consequently learns to despise the risk incurred, and to think that one man can administer ether, gas, or chloroform, as well as another; this conception being most unfair to those surgeons who make the administration of anæsthetics a specialty; whilst, more important still, the presence of the unqualified administrator would impede rather than aid any of those recuperative measures which must be so promptly adopted when accident occurs. And here I may say that, had we not both been qualified men and up to the emergency in the above mentioned case, I believe the life of the unfortunate patient would have been sacrificed. Again: many second-rate and unqualified dental practitioners, who are in the habit of giving gas themselves, either for the

sake of economy or as an inducement to patients to be "operated upon," as I have seen it advertised, "by the new painless method," place "*surgeon*-dentist" on their door-plates—a title which, to my certain knowledge, deceives even the most intelligent, and thus indirectly serves to bring odium upon the surgical profession; for I have been innocently asked how it was possible that this man or that man, being so uneducated, could have passed an examination as a surgeon; and the questioner seemed astonished when I replied that the assumed title by no means implied a surgical diploma. I trust that the time may not be far off when every dentist will be of necessity a surgeon; but until then the public ought to be warned that "surgeon-dentist" emblazoned outside a door or upon a lamp does not as a rule, imply any superior education whatever, but rather the reverse. But this is foreign to the subject and to the first object of this letter, which is to impress upon those members of the dental profession who are not fully qualified that anæsthetics, of whatsoever kind, should never be administered under any circumstances save by duly qualified practitioners.

I am, &c.,

Old Burlington Street, July 21, 1874. S. Hamilton Cartwright.

DENTAL EXAMINATIONS.

TO THE EDITOR OF "THE MONTHLY REVIEW OF DENTAL SURGERY."

Sir,—Will you allow me to state, in answer to numerous enquiries, that so far as I am aware, candidates for the Dental Diploma, presenting themselves for examination (under the conditions in force up to September, 1863), will have to undergo the same examination as that set for the candidates who have fulfilled the curriculum laid down by the Royal College of Surgeons.

Nor can I see that there is much hardship or injustice in this, as regards those who were in practice previous to September, 1859, and now propose taking the Dental Diploma under the old regulations.

Those gentlemen must bear in mind that they have the advantage of fifteen years experience on their side, as against the short professional career of the students of the present day, and although they may find it rather tiresome resuming an acquaintance with the anatomy of the head and neck and the physiology and pathology of the teeth and adjoining structures, they can hardly say that they have to waste time on the attainment of knowledge, that is not available in every day work.

It must, moreover, be borne in mind that those of us who have devoted a large amount of our time to obtaining the Dental License, may fairly look to the Royal College of Surgeons, that they do not admit or pass any practitioners, but such as are likely to prove worthy holders of the College Diploma.

In order to make the Dental Diploma the recognized standard of the profession, it is more than ever important that the examination should be of such a nature that it may be held in respect both by candidates and the members of the medical profession generally, and this position, I believe, the Dental Board will certainly take up.

Those who have gone through the curriculum know how great a boon the Council of the College is granting to those whom it examines under the old regulations. The amount of knowledge required for the examina-

tion cannot be complained of, nor does its attainment present much difficulty, when it is left to the candidate to obtain it at such time as may best suit his own convenience, instead of having (as under the curriculum) to turn out in the dim twilight of a winter's morning to attend Anatomy lectures, or get an hour's work in the dissecting room, before the other duties of the day begin.

Yours truly,

OAKLEY COLES.

81, Wimpole Street,
Cavendish Square.

THE DIPLOMA QUESTION.

TO THE EDITOR OF "THE MONTHLY REVIEW OF DENTAL SURGERY."

SIR,—Allow me to ask a question concerning the examination now thrown open. I observe that in the petition the words "fair and searching" are employed, but that four of the Petitioners substituted the word "usual."

What are we to understand? If the Secretary of the Committee would kindly explain, as definitely as he can, the nature and extent of the examination, it would be of great assistance to many.

Yours, &c.,

INQUIRER.

THE LATE DR. HITCHCOCK.

At a meeting of the faculty of the Dental School at Harvard University, President Eliot presiding, the following resolutions were adopted, viz:—

Resolved. That the faculty of the Dental School of Harvard University have been deeply grieved at the death of their dean, Dr. Thomas Barnes Hitchcock, and in recognition of his character and services, deem it their duty to place on record their regret for his loss and their sense of his merit.

Resolved. That in him the Harvard Dental School has lost a valuable officer, whose unwearied and successful discharge of the duties of his professorship and unselfish interest in his work as dean, entitle him to the respect and gratitude of all who are interested in the cause of Dental education.

Resolved. That the dean be directed to communicate a copy of these resolutions to the family of the deceased, with assurances of our sincere sympathy in their bereavement.

THOMAS H. CHANDLER, Dean.

TO CORRESPONDENTS.

ALL communications intended for the Editor should be addressed to the care of Messrs. SMITH, ELDER & Co., 15, Waterloo Place, Pall Mall.

All inquiries respecting Advertisements and Subscriptions should be sent to Mr. GEORGE BUTCHER, 4, Crane Court, Fleet Street, E.C.

TO THE EDITOR OF "THE MONTHLY REVIEW OF DENTAL SURGERY."

SIR,—The question propounded by "Vigilans" still remains unanswered, "With whom did the proposition to erect a bust originate?" but will probably be replied to ere long by the announcement of a Committee and a first list of Subscribers in furtherance of the object proposed. This answer will not be an altogether satisfactory one, for a *public* testimonial ought to have its origin *ex animo* from the whole body of the profession; it should not spring from the suggestion of any but highly distinguished and well-known members and its proposal should be spontaneous. I agree with "Vigilans" in thinking that Mr. Saunders has far too much pride to accept a testimonial in the *proposed form* now that such difference of opinion has manifested itself, this springing too from men, if we can judge from the tone of the correspondence, of education, and above all of independent thought. Mr. Saunders is entitled to and and has received every credit for his munificence, and none will begrudge him that recognition which his activity deserves. Testimonials, like Baronetcies to potentate-receiving-Mayors, lose their value when too frequently bestowed, and if they are to be presented to every man who is the giver of a donation to a charity, the honour of the gift will soon be *nil*. The Dental Hospital, it is true, is well placed; but it must be recollected that otherwise it has not any other special advantages over the old Hospital which with far less expenditure might have been rendered quite as useful, and certainly would have been found far more commodious than the new building, which I fear will be found too small for its requirements before long, if the school continues to increase as it has hitherto done

Let those who are so disposed by all means express their appreciation of Mr. Saunders privately amongst themselves—and to such a tribute I would gladly add my contribution—but where a part of the profession has shewn the feeling which has been exhibited with regard to this matter, I think that it would not be just to insist upon the *setting up of a bust* of Mr. Saunders in the Hospital, which would lead others to think that it was placed there by unanimous desire. I disclaim all personal feeling in these remarks, and I am glad to acknowledge here that gentleman's recent services and generosity as cordially as any man, but I do consider that if public testimonials are still to have some value attached to them they should only be given under very rare and exceptional circumstances. If Mr. Saunders has a bust placed in the new building surely all those to whom we are indebted so much for the first creation of a school and hospital, and above all for those unselfish labours which gave to a divided and heterogeneous calling the dignity of a profession and a substantial existence, which caused medicine and surgery to graft us upon the parent tree of their science and art. If we judge from the unassuming manner in which those gentlemen worked, we must conclude that they would be the first to refuse the proffered honour, whilst perhaps some of them in that modesty of spirit which so becomes great men, however worthy of the position, might even shrink from a comparison between themselves and him whose bust seems to rule as an inspiring and a presiding deity over our scientific deliberations in Leicester square.

Si monumentum quæris, circumspice! If a monument is sought for those men of whom I speak the result of our circumspection is close at hand, for I am sure that all feel—but above all themselves—that it already

exists in that recognition of their labours which is shown by the improved condition of their profession and by the gratitude which all its younger members, of whom I am one, feel towards them—a gratitude which we can best render substantial by working for the good name of our profession in the same self-sacrificing, noble manner, of which they have given such example. Such work to be effective must be wholly unostentatious and connected with no second thought of personal renown, of professional advancement, or of social popularity, for in all such labours above all the right hand should not know what its fellow giveth. Each labourer should have but one idea, the social and the scientific advancement of his profession, and in its present relation to medicine and surgery we should never stay our labours until we can honestly inscribe upon our banner "*Nulli Secundus.*"

Our speciality is passing through a crisis and though there is a haven there are many breakers ahead to be overcome before we can attain its calm, untroubled waters; and this is why all those who hold a high and recognised position in it, whether conferred by fortune or by merit, cannot be too careful of acting in any way which, however innocent may be the motive, may cause their less well informed brethren to form a false conclusion as to the *example* (for such they may esteem it) set before them, and here I especially allude to methods of gaining professional notoriety or advancement.

I trust that you will forgive me for taking up so much of your space, but I wish to lose no opportunity of impressing upon all at the present time, when such activity is manifest within our ranks, that the future position of Dental Surgery is entirely in our own hands

In America, the medical profession repudiates a connexion with it for many reasons which anyone who has stayed sufficiently long in that country can well appreciate. In England we are affiliated with that illustrious College, whose degree confers a position over the whole civilised world, whereas across the Atlantic nearly every general hospital and Dental College confers its own diploma, the value of which in many cases is but little, for each school has to enter into competition with its fellows, a necessity which does not elevate the character of their respective examinations. Now matters are improving even there. But this is a digression and I must refer those who are interested in Transatlantic politics to the last two numbers of the *Dental Cosmos* where they will see the reasons, many of which I candidly confess I esteem to be all convincing, why Medicine objects to connect itself with Dentistry there. But few of those reasons apply to us here, and those are only to be found amongst men whom we cannot accept as brethren ourselves, and therefore I call upon every younger man to confirm the noble labours of those veterans to whom they owe so much.

I fear I have laid myself open to the imputation of that which an Indian would term "long-windedness" but I felt that "Vigilans" and others have expressed the sentiments of so many that I could not resist asking the favour of a hearing also. Having no feeling of any other kind than the well-being and advancement of my profession as the motive of this letter, I will adopt no *nom de plume*, but subscribe myself,

Sir, your obedient Servant,

S. Hamilton Cartwright.

32, Old Burlington Street,
August 8th, 1874.

THE MONTHLY REVIEW

OF

DENTAL SURGERY.

No. IV. SEPTEMBER, 1874. Vol. III.

THE FUTURE OF THE PROFESSION.

It is now eighteen years since Mr. Lee Rymer, of Croydon, made a public effort to draw dentists together, and form a union of some kind which would give the profession a recognised status. At that time any man could call himself dentist, and the public had no means of ascertaining whether he was one in reality or name, except by the road of bitter experience. Some men, anxious to distinguish themselves from the merely nominal dentist, took the membership of the College of Surgeons, a diploma highly honourable in itself, but insufficient to satisfy the public as to the holder's ability to practice as a dentist. Indeed, it sometimes happened that dentistry formed a refuge for those who had been unable to make headway as surgeons, or who had after repeated trials failed to get the College diploma. There was for these gentlemen no dental hospital nor school, in which they could receive the instruction they so much required, and perhaps fortunately for them, no board of examiners to confer upon them a distinct certificate of qualification to practice dentistry.

Although the movement inaugurated by Mr. Rymer has

drifted away with the tide of time, and other ideas have—for better or for worse—superseded the course indicated by him and his colleagues, still the fruits of his energy are abundantly evident in the existence of several dental hospitals and two or three dental schools, and an examining board conferring a dental license under the auspices of the Royal College of Surgeons of England.

How far the existence of so many schools is an advantage is a question yet to be solved. To us it appears that so many competitors appealing to a necessarily limited constituency must ultimately prove a source of weakness to each other and a corresponding disadvantage to the students. True, one of those schools is in a remote corner of the Island, whither some students may go who fear the contaminated atmosphere of London: how far the resources of a fourth-rate provincial town can afford the necessary practice for a paying number of pupils is a point only to be settled by those who try. The other two schools are in London, one in full and vigorous action, but the other, although connected with a London College of high repute, has for some reason omitted to publish in its prospectus all the names of the teachers of the necessary subjects; the future alone will settle the value of this opposition to the original institution.

Thanks to the untiring efforts of Mr. C. J. Fox, and a committee which was ultimately formed, the College of Surgeons has afforded an opportunity to those gentlemen who have hitherto neglected to take the L.D.S., an opportunity to repair their mistake. This wise and liberal measure will no doubt prove a source of strength to those who desire to elevate the profession and rescue it from the hands of men who seek, by tacking themselves on to it regardless of qualification, to give themselves a spurious lift in the social scale, and so drag the profession through the

mire of ignorance. When a goodly number of names appears on the list of Dental Licentiates, the desire and necessity for registration may then be heard by virtue of the numbers as well as the rights of the applicants, supported by the needs of the public at large.

The greater the number of Dental Licentiates, the sooner will the public understand clearly the state of affairs, and the greater will be our influence on the medical profession, whose recommendation of a dentist is now too often based on some accidental acquaintance, or on the solicitations of some friend of the so-called dentist, rather than on the professional status of the man. So far, the prospects of the profession are encouraging, and the student who now joins it may look forward to earning his living amongst an honourable fraternity, which has yet to take higher steps in social preferment.

The changes which we have indicated have developed more and more rapidly as they have gathered impetus from every fresh evolution, and as time goes on there will no doubt appear some unexpected conditions born out of the new state of things, which may not be altogether desirable. We have already questioned the propriety of the multiplication of schools, but however much the student may be inconvenienced, an independent examining board will protect the public from any evils which may arise from that source. There is, however, a tendency manifesting itself among the rising generation of dentists, to make that part of their profession which can be learned at the dental and general hospitals, the great end of their studies, while the mechanical branch is left as far as possible to take care of itself: perhaps one of the reasons for this laxity in so important a matter, is that the examiners take no notice of mechanical dentistry.

It is clearly not within the province of the College of

Surgeons to do so, and there is no preliminary board provided to examine a candidate on this subject, and send him on with his certificate to the College for further examination. This is an evil which may one day tell with damaging effect on the profession as a whole, for however perfect a man may be in one department of his art, it cannot compensate for deficiency in another. The race of good mechanical dentists must in time become extinct, for if the masters in the profession know not how to direct and produce good workmanship, who is to train the workman of the next generation?

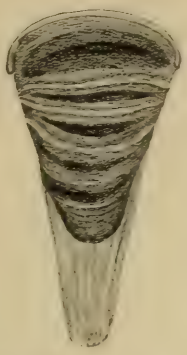
A diploma and a system of registration may protect the dentist in the pursuit of his profession, but it will not prevent men of mechanical ability becoming tooth makers, or working under some such designation; and although the public will at all times be best served by the dentist who is an accomplished mechanist as well as a surgeon, still they will not be slow to find out that the non-surgeon and good mechanical tooth maker is in very many instances far better than the surgically educated dentist who has neglected the mechanical branch of his profession. In the midst of much that is bright and hopeful, this one dark spot causes us some apprehension for the future of dentistry.

LONDON SCHOOL OF DENTAL SURGERY.

The distribution of prizes at the above-named School, will take place in the Theatre of the London Dental Hospital on Monday, October 5th, at 4 o'clock in the afternoon. Mr. Savory will, we understand, take the chair.

As this will be the first public distribution of prizes that has taken place, we trust the profession will show its interest in the progress of the School by a large attendance on that afternoon.

Fig XLIX.



Janassa ovatus.
Upper Surface. Nat Size.

Fig LI.



Janassa ovatus.
Side view. Nat Size.

Fig LIII.



Janassa ovatus
Under Surface. Nat size.

Fig LV.



Janassa minutus.
Upper Surface. Magnified 3 Diam.

Fig L.



Janassa ovatus.
Under Surface. Nat Size.

Fig LII.



Janassa ovatus.
Upper Surface. Nat Size.

Fig LIV.



Janassa ovatus.
Upper Surface. Nat Size.

Fig LVI.



Janassa processus.
Side View. Nat Size.

T. Bessent, lith, 29 Essex St. Strand

ON THE

MICROSCOPICAL STRUCTURE OF FOSSIL TEETH,

FROM THE NORTHUMBERLAND TRUE COAL MEASURES.

By W. J. BARKAS, M.R.C.S.E., L.R.C.P. London.

[*Continued from p.* 105.]

JANASSA.

This is the only representative of the Ray family that has been obtained from the Coal Measures of this district, or so far as I am aware, of any other coal measures, but teeth, having all the characters of Ray teeth, have been discovered in more recent formations. In order that we may see clearly the relationship of this genus to the Rays, I shall first draw attention to some characters peculiar to several fishes of that family existing at the present time. All modern Rays have a cartilaginous endo-skeleton teeth, and most of them have also spines and dermal tubercles; the teeth are arranged in rows in the mouth, so as to cover the whole of the floor and roof, the rows being placed transversely and one behind the other, the central tooth in each row is, as a general rule, the largest, and the teeth on each side gradually diminish in size as they proceed from the centre, the most external is, therefore, the smallest, and differs most from the central typical tooth: the number of teeth in each row and the number of rows, of course vary in the different fishes. The Rays generally possess more teeth than the Sharks or Hybodonts, which are more closely impacted in the mouth, and therefore less mobile; in the Eagle-Rays they are united laterally by fine sutures, their teeth are flatter, and more adapted for crushing than lacerating food. The microscopical characters of existing Ray teeth, I shall refer to in my next paper, at present I only intend to deal with the external characters of Janassa.

This carboniferous genus was formerly named Climaxodus by Professor M'Coy, but further investigations, pursued by Messrs. Hancock & Atthey, have clearly demonstrated that it is not a distinct genus, but is closely allied to the genus Janassa found in the Permian formations, which had been described and named some time previously by Count Munster. Janassa has therefore existed during rather a prolonged period, viz., from the Sub-carboniferous Limestone age, through the period of the

True Coal Measures, right into the Permian formations; it has not yet been discovered beyond the Palæozoic strata. Only one variety has been found in the Sub-carboniferous Limestone, and the most perfect specimen that has been obtained, is itself only a fragment, it was described and figured by M'Coy in his "British Palæozoic Fossils" under the name of Climaxodus imbricatus; this fragment, then, was the source of the above generic name, and it is probable that the author had not compared it with Janassa, either externally or internally, when he founded the supposed new genus. The species that were obtained from the Coal Measures, were also named Climaxodus, on account of their similarity to the fragment figured by M'Coy, but in a paper by Messrs. Hancock & Atthey, which appeared in the third volume of the "Transactions of the Northumberland and Durham Natural History Society," it was clearly shewn that the so-called Climaxodus differed but little externally, and not at all internally, from Janassa of the Permian period, as described and figured by Munster, therefore these authors decided very naturally that Climaxodus was merely another species of the genus Janassa. Any palæontologist wishing to decide this point for himself, cannot do better than study the above paper, for it exhausts all that is known about these two genera up to the present time, and enters into the subject so fully, that I shall in this paper give a mere outline of the similarity of their characters. The Permian species were the first to be discovered, and three species were described and figured by Count Munster in his "Beiträge sur Petrefactenkunde;" these specimens were found in the Kupferschiefer of Germany. Sometime after the above work appeared, some capital specimens were obtained from the marl slate of Durham, these were described and excellently figured by Messrs. Hancock & Howse in the third volume of the Transactions I have mentioned above, and they belonged, without doubt, to the species J bituminosa of Munster.

There have been three varieties of Janassa obtained from these Coal Measures—J. ovatus (Barkas) or linguæformis (Atthey), which of these names has priority is yet a matter of dispute, and I gladly leave it to the authors to settle, J. minutus, and J. processus. Of these species, only the teeth have been preserved, the rest of the skeleton being cartilaginous, has not been able, as we saw to be the case

in Selachians, to resist the process of disintegration for a long enough period to become fossilized.

The teeth of J. ovatus or linguæformis, are generally found singly, but Mr. Atthey has a slab in his possession containing seven primary teeth and three secondary, which are arranged so as to shew clearly enough how they were placed in the mouth, and they also point out the difference between the central and the most external teeth in the same row. Messrs. Hancock & Atthey, in their paper on Climaxodus that I have already mentioned, after describing this slab and the different teeth upon it, sum up thus—"From the above, it appears that there is evidence enough to show that in Climaxodus, as in Janassa, the teeth are placed in transverse rows of seven teeth each, one being symmetrical and central, and six lateral, three on each side, the extreme lateral tooth on either side being Petalodont in form, that there are more rows than one, and that they are placed in both the upper and lower jaws. In fact, it is quite evident, not only that the teeth in Climaxodus agree in external character with those of Janassa, but that they also agree with them in their mode of arrangement." All the specimens in my possession are single teeth, but having had the opportunity of examining those in Mr. Atthey's cabinet, I quite agree with the conclusions he has given in the above statement. The central or primary tooth, is the most typical of this species: it is compressed from above, downwards, elongated antero-posteriorly, and tapers as it proceeds backwards. The superior surface (Fig. XLIX.) may be divided into a narrow and a broad portion; the narrow portion, which points backwards into the mouth, is convex from side to side, and slightly so from before backwards, it is crossed by from four to six transverse imbricated ridges; these ridges are sometimes straight, occasionally concave towards the broad end, but generally they are convex, in some specimens that have been evidently crushed, these ridges are undulated, the most anterior ridge is always convex to the broad end, the edges of the ridges are sometimes smooth, but generally they are rough or tuberculated; the broad end is deeply hollowed out, this depression is bounded in front by a sharp raised margin which is convex anteriorly, the edge of this margin is punctuated, but most markedly in worn teeth, the posterior border of the furrow is formed by the convex first ridge on

the superior surface of the narrow extremity, the concavity of this depression is most marked from before backwards. From the under surface of the narrow end of the tooth projects directly backwards a broad depressed bony root, which tapers as it proceeds from the tooth proper, the upper surface of this root is convex from side to side (Fig. XLIX.), the root and the tooth proper, when examined from the under side or in profile, appear continuous, and presents a sigmoid contour (Fig. L. and LI.). The smaller or secondary teeth near to the primary, are similar to the above, except that they are smaller, more distinctly oval, and sometimes circular on the superior surface (Fig. LII.), they posses fewer ridges on the narrow portion, and the furrow in the anterior end often nearly equals in length the posterior extremity. Fig. LIII. represents the under surface of another secondary tooth situated nearer the end of the row than the tooth shewn in Fig. LII., I have given this drawing on account of its striking similarity to a tooth of Pleurodus affinis, in fact I took it to be a specimen of that species when I received it, for the superior surface was not then exposed, but after I had cleared the shale away from that surface I perceived my mistake, and found it to be an undoubted specimen of J. ovatus. The Petalodont form of tooth is only represented in my cabinet by the specimen shewn in Fig. LIV., it certainly does resemble the tooth of the genus Petalodus in its external form, and had I not had the opportunity of perusing Messrs. Hancock & Atthey's paper, I should have certainly concluded it to be a variety of Petalodus, we have, however, a very good test between Climaxodus and Petalodus in the difference of their minute structure, as we shall see when I come to that portion of my subject. This Petalodont tooth appears much more compressed than the central teeth, the superior surface is almost flat, the posterior and anterior portions are nearly the same breadth, and are divided from each other by the only ridge to be observed; the anterior portion is slightly concave, the posterior is flat and ridgeless, the surface is somewhat smooth and glistening, and is covered with very minute pores, there is not any base projecting from the under surface of my specimen. The size of the tooth, it will be seen, varies very much according to its position in the mouth, the central teeth in my possession average nine-tenths of an inch in length, and

seven-tenths in breadth at the broadest part, the smallest secondary tooth is seven-twentieths of an inch broad, and two-fifths long; the Petalodont tooth is two-fifths broad and half-an-inch long. These measurements apply to the superior or crushing surface, the root projects still further and lengthens the tooth, the length of the root differs considerably in the specimens, in one tooth it measures nearly half an inch.

J. minutus differs very little from J. ovatus, except in size, Fig. LV. is an enlarged drawing of the only tooth in my possession, I am not aware that any palæontologist has been able to find another in this or any other district. Across the narrow portion run two ridges, one nearly in the centre and the other at the anterior extremity, forming the boundary between this and the broad end; the concavity in the anterior extremity is very shallow, no process is discernable proceeding from the under surface. This species was thus named by Mr. T. P. Barkas, F.G.S., it may be, however, merely a very young tooth of J. ovatus, but for the present it is better to retain it as a distinct species.

J. processus (Fig. LVI.) was discovered by myself a short time ago; the tooth proper resembles J. ovatus in every respect, the root, however, does not proceed directly backwards, as in Fig. XLIX., but it points downwards with a slight inclination backwards, it is also shorter; this form of root is similar to the base of some of the Permian varieties of Janassa, as described by Munster.

ON THE USE OF COHESIVE FOIL.

BY GASCOIGNE PALMER, L.D.S.

CHELTENHAM.

NO. 3.

I will now suppose that those who are anxious to become acquainted with my mode of using cohesive foil, or rather, perhaps, I ought to say with the mode I recommend, have tried my plan for a first trial, as stated in my last paper, and if they have been careful and painstaking, have come to the conclusion, that gold annealed and dry will weld into a solid and hard mass, capable of bearing

great wear and tear, and also of taking a most beautiful polish and finish, and keeping it.

The first application of cohesive gold in the mouth that I shall endeavour to describe, will be putting a surface layer of cohesive gold on an ordinary wedged plug of stale gold, in the crown of a first lower molar. I select this tooth as being the best to commence operations on for two reasons:—

First, because a crown cavity in this tooth is a very easy one to work at.

Secondly, because there is no case in which it is more difficult to exclude the moisture than this. Thus the working of the gold will be under the most favorable circumstances, except in the one particular of the exclusion of moisture, and anyone who once masters the application of the rubber dam in this case, will have very little trouble in applying it any where, when it is possible to use it with success.

There is one more reason that I will incidentally mention, why this case is good to begin the use of cohesive foil. Supposing you find the water gaining access to your plug, and you are unable to check it, you can finish your plug off with stale gold, and the patient will be none the wiser, and not much the worse off.

I think we may divide our operation into four parts:—

1. The preparation of the cavity.
2. The application of the rubber dam.
3. The introduction of the stale gold.
4. The surface layer of cohesive gold.

We take an ordinary crown cavity in a first lower molar, and with a Tomes or Louis Jacks chisel open it freely at its orifice, making the walls as nearly parallel as possible, being, at the same time, most careful to get rid of all angles or notches, at or near the enamel; then, with an excavator, we feel our way towards the base of the cavity, being careful to cut away no more than is absolutely necessary in this direction, and less, if we find that there is the least chance of exposing the pulp. If we find that the extent of the caries in no way affects the pulp, we cut well down to the base of it, making a clean, dry cavity.

It is as well here to advise that no undercut be made: undercuts, I am sure, are a mistake, unless they are

required, and this they very seldom are; I do not think I make an undercut for gold plugs once in a week, and I never make one for cohesive plugs, knowing that it is impossible to work cohesive gold perfectly in under them, in fact, in crown cavities I invariably make the opening in the enamel the largest part of a cone, which gradually narrows towards its base.

No. 2.—The application of the rubber dam.

In a paper on this subject in the December, 1873, number of the Dental Review, I explained the manner of useing the rubber dam for this case, and I have little to add to that paper, except that I now use a larger piece of rubber dam than I did then.

No. 3.—Next comes the introduction of the stale gold.

Now I strongly recommend for this operation C. Ash & Son's No. 2 foil, or Smale's No. 8. I prefer the latter, it is more uniform in its manufacture, and on being heated it is more cohesive, and, whenever it is possible, all plugs should be commenced and finished with the same gold.

I have no doubt that the very best way of plugging a crown cavity in a lower molar with stale gold, is with cylinders. Having in view the putting on of a cohesive layer of gold, your cylinder should be shorter than you would use for an ordinary stale plug, they should each be put in the spot where they are to remain, and when as many are placed in the cavity as it will hold, a wedge shaped instrument should be used to drive them against the sides, the space caused by this instrument should be filled with another cylinder, or small strips of gold, but be very careful to use no condensing instrument, as cohesive gold will not readily cohere to gold that is not cohesive.

The plug of stale gold ought now to be ready for its cohesive layer, and if my instructions have been carried out, its surface ought to be a very rough one, each projecting bit of gold being portion of an intact piece of gold foil to the very base of the cavity.

No. 4,—Adding the cohesive layer.

Take a sheet of the same gold, Ash's No. 2, or Smale's No. 8, plain foil, and cut it into strips about an inch wide, fold this in four, lengthwise, and cut into pieces one-eighth of an inch wide. Do not anneal it before or after preparing, for there is no time that is as good for annealing, as when the gold is on the point of the instrument that is going to convey it to its place in the tooth.

The instrument that I should use for getting in this case the first pieces of cohesive gold to combine with the stale gold already in the tooth, is Arthur's No. 9.

Much care must be taken in making the first pieces thoroughly unite with the stale gold; this is best done by pressing the end of the cohesive strip firmly down on the rough surface of the stale gold, and then turning the stale gold down on the cohesive.

Having introduced a dozen or more pieces of cohesive gold in this manner, you will have such a surface as will bear condensing, and be ready for as much more cohesive gold as you may wish to add.

The best instruments to use now are Butler's foot pluggers, No.'s 6 or 8, or Louis Jack's No. 4; these may be used with hand pressure, but the plug will be made more rapidly and dense with a Robbin's mallet, or one of Hele's case impactors.

When the plug has reached such a height as is desired, finish with a file, corundum and polishing stick, and always be particular to see that your plug is free of the bite, for I have seen many cases of inflammation of the peridental membrane, due entirely to the overfilling of teeth. Where the operator has a Morrison's engine, the finish will be conducted with a plug finishing burr, corundum point, &c.

If all moisture has been excluded, and my directions carefully carried out, I have no doubt but that the operator will have made a very beautifully finished plug, and it may be, that he may resemble me, when I made perfectly the first of this description of plug—immensely astonished at his own work. If so let him content himself with trying to use cohesive gold in this manner only for the next month, he will then have gained so much experience in its use in the mouth, as to be ready to follow my instructions for the making of a matrix plug in an upper molar, of which it is my intention to speak in my next paper.

Before concluding, I wish to state with regard to certain comparisons that have been made between my views and the views of others, that I do not to-day state that it is impossible, from the nature of cohesive gold, to make a moisture tight plug with it, and to-morrow attempt to teach the profession how to do that which yesterday I said was impossible. I have not yet said or written, as far as I know, that it is impossible to make a moisture-tight

cohesive plug by wedging; all I have said is that it is impossible to make a perfect cohesive plug by wedging, and for my opinion as to what a perfect cohesive plug is, I must refer to my first paper on the subject.

Another point is that I never make or attempt to make a cohesive plug, where the tooth can be as advantageously filled with stale gold, wedged.

The great charm about cohesive gold is, that it can be used where stale gold cannot be, and where amalgams so frequently are used in consequence; it is not a substitute for stale gold because there is no want of one, but it is a substitute for amalgam because there is a want of one for many reasons.

GOLD POINTED PLUGGERS.

We have received the following communication from Mr. Rollins, of Boston, United States:—

Dear Sir,—Through the kindness of the Boston house of S. S. White, I have had an opportunity of examining the gold-pointed plugger, introduced to the profession by Mr. Chance. The patentee claims, first, that any admixture of another metal with the gold, as from the wearing of the steel points in use, is an injury to the filling, and implies that this objection is overcome in the gold-pointed plugger. This may certainly be considered doubtful, for Mr. Chance says that his points are alloyed, in order to render them stiff enough for use, and considering how much softer alloyed gold is than hardened steel, the probability would seem to be that more foreign metal will be introduced in each filling with the gold-points than with the steel.

2nd. He claims that they will not cut through the gold. Experience proves the contrary.

3rd. "They are kin to the metal used and will not destroy the property of cohesion." This would seem to be the case. Those who have used smooth steel points have found it difficult to make the next piece of gold cohere, when they have rubbed the surface of the unfinished filling. With the gold points this difficulty is not so marked.

4th. They do not slip so readily as the smooth steel points which, theoretically, have been the most perfect in use, for they bring the pieces of gold in direct contact.

5th. They can be bent to suit any particular case.

What then are the advantages of these points over those previously in use?

1st. Less liability of destroying cohesion. 2nd. Less liability of shifting. 3rd. Capability of adaptation to each particular case, on account of the ease with which they bend.

Disadvantages—

1st. Greater liability of introducing foreign metal into the filling. 2nd. Greater liability to bend out of shape. 3rd. Serrations; preventing,

theoretically, perfect cohesion, for the pieces can only touch where the points of the serrations come in contact with the gold.

The question now arises, is there no other way of obtaining all the advantages of the serrated gold-points with fewer of their disadvantages?

Perfectly smooth, soft, steel points, plated with pure gold, would seem to answer the requirements. They could not admix any other metal with the gold, they would slip less readily than the smooth steel, would be as perfectly adapted to each particular case, would bend less readily out of shape, and not having serrations would bring the pieces of gold more evenly in contact, making more extended cohesion possible.

That with serrated points perfect cohesion is almost an impossibility, will be admitted by any one who will, after filling a cavity, take out the gold and try to hammer it as he can a piece of cast gold.

That in many, so-called, cohesive fillings, made with serrated points, there is really no cohesion, must be admitted, if the statement of Hood & Reynolds, manufacturers of gold foil, in Boston, is correct. Mr. Hood stated that he had taken two sheets of the "Semi Cohesive Foil," made by Mr. S. S. White, and after perfectly "annealing" them, placed them in contact and pounded with a heavy hammer, without obtaining any union. Now there are many contour fillings, made of this semi foil, which are doing good service.

In order to test the Chance pluggers, a cavity in a tooth was prepared, and holding the tooth in the fingers, the cavity was filled with cohesive gold. After burnishing the surface of the filling, a moisture-proof varnish was applied to the whole of the exterior of the tooth, except the enamel and filling. Care was also taken to close the root canals.

The tooth was then placed in an alkaline-carmine solution, and allowed to stay, as directed by Mr. Fletcher; upon its removal the enamel was found coloured throughout its entire thickness, but the depth of the colour around the filling was not deeper than elsewhere.

In every tooth which the writer has tested in this way, whether filled cohesively with serrated points, cohesively with smooth points, or non-cohesively, this has been the result, and having so invariably obtained this result, one cannot but be surprised at the remarkable success of Mr. Palmer and others in England, in making cavities moisture-proof, in a substance itself permeable to fluids.

WILLIAM H. ROLLINS.

1, Mount Vernon Street, *Boston*, *U.S.A.*

OBSCURE DISEASES OF THE TEETH.

BY A. HARTUNG, OF RUDOLSTADT.

(Deutsche Vierteljahrsschrift.)

THE following cases of diseases of the teeth, which I have lately had the opportunity of observing, one after the other, offer, notwithstanding, great differences in their appearance, nevertheless, this in common, namely, that all of them in their commencement, could not be recognized as diseases of the teeth. They exhibited the outward

form of other diseases, and thus showed, more or less, the great importance of the teeth in relation to the general organism.

1.—A gentleman of about fifty years of age, of a strong constitution, rejoiced in a splendid set of teeth. No tooth was wanting, and, according to his own belief, there was not a single carious one, a circumstance of which he often boasted to me, as he, a very busy surgeon, too often had the opportunity of becoming acquainted with the dental ailments of others.

Meeting me after a lapse of some time, he complained that for some time a rather severe pain in the neighbourhood of the left outer corner of the eye, as well as a spasm of the left upper eyelid, had been very troublesome to him, hindered him in his work, and not seldom robbed him of his night's rest. All apparently rational means which were brought into use, were without results. Toothache, or any unusual appearance in the teeth was not seen. As mentioned above, I found an excellent set of teeth; nevertheless my suspicion that a diseased tooth was present was soon confirmed. Using a knee-shaped excavator as a sound, a carious cavity on the back wall of a left upper wisdom tooth was found, and by further pressure the sensitive exposed pulp. The patient, immediately confirming my suspicion that the pain proceeded from the tooth, demanded the immediate removal of the same. As was expected, the tooth having been extracted, the cause of suffering was removed. The pain and diseased appearances disappeared, and returned no more.

2.—A strong thickset man, fifty years of age, who had in general enjoyed good health, had suffered for several months from very severe headache, extending over the whole head. The treatment of several doctors had proved useless. That the suffering in its severity and extension could arise secondarily from the teeth, was naturally entertained. I recommended an examination of the teeth, found in the second upper right carious molar the pulp exposed, treated the same with arsenic, and the suffering disappeared. The tooth was filled with amalgam.

3.—A girl fourteen years of age was brought to me on account of left upper canine being very much pressed forward. The next temporary tooth was still present, wedged in the space between the canine and the first small

back tooth and small incisor. The removal of the temporary tooth, which I immediately wished was not allowed; it was expressly wished that all school work, confirmation, and so on, should first take place. So after several months, the extraction only took place, which, on account of the tooth being so wedged in, was rather difficult. The very long fang only absorbed on one side, was very pointed at the end. This case, not an uncommon one in itself, was of great interest, as on the removal of the tooth a rash of the nature of Roseola from which the child had suffered for several years, disappeared. It began generally on the left side of the face, was very unpleasant, and frequently confined her to her room. It never occurred again.

Whether this frequent illness was in consequence of the pressure of the above mentioned dental group, and the irritation from the sharp point of the fang of the temporary tooth, or was in connection with the period of life of the patient, I should not like to speak with absolute certainty, though I am not inclined to the latter supposition, as the whole appearance of the girl was childish, and parulis had never occurred. The relations of the patient considered the former disease entirely due to the abnormality of the teeth, and they had so much more right, as otherwise, no other present change in the health of the patient could be connected with it.

4.—A lady, twenty-eight years of age, with a small, thin face, who had never been really ill, except with childish diseases, with whom I became acquainted five years ago, shortly after her marriage, when she came to me for advice, then, for the first time in her life, on account of her teeth, had very large, uncommonly white teeth. The upper incisor stood out very much, notwithstanding that it had been several years before, very much shortened with the file, in order to improve the appearance of the face. Much care had been bestowed upon her teeth, as several gold fillings showed. Some of such fillings had been lost, others had carious furrows at their edges.

The general characteristics of the lady should here be noticed, namely, that she belonged to those intellectually gifted natures whose nerves and intellect preponderate. The first examination of the teeth, and the result that was gained with the former well carried out gold stopping, augured unfavourably in the future for the preservation

of the teeth. This was fully confirmed, as, notwithstanding the utmost care, the back teeth were lost very rapidly, especially after two quickly following confinements. At a later consultation, my patient remarked at once that she could not have much done to her teeth this time, as she was undergoing a thorough course of medicine, on account of an intermittent fever which she had caught on her last journey, and which was connected with neuralgia of the face, every attempt to diminish the suffering, from which, was without success. I had not seen her then for nine months, and again lost sight of her for about the same time. A short time ago she came one day with her husband. To my first question, what course her illness had taken, and how she was then feeling, she replied, with a happy face, that she was quite well, and that it would be especially interesting to me to learn that the sole cause of all her suffering had been a diseased tooth.

The following was then related to me. The facial neuralgia had always occurred in a curved line, from the right outer corner of the eye, to about the middle of the forehead, and had never left this line. The pain soon only took place at certain times, and was first accompanied with shudderings, followed by heat, and finally with strong general perspirations. The attacks begun at 6 o'clock in the evening, and ended only at 2 o'clock in the morning. The illness was, as was only natural, considered intermittent, and the more so as enlargement of the spleen was found. A course of treatment was now undergone, and a favourable result expected, as here we possess a specific which seldom leaves us in the lurch. The use of quinine began, this, however, soon seemed useless, in whatever doses or variety. Change of doctors of course occurred. The patient went from one celebrity to another; always intermittent fever with the usual symptoms of pain, sleeplessness, and so on, treated as one would imagine with quinine, also with embrocations, subcutaneous injections, morphia, chloral, etc., but in vain. The patient was ordered sea bathing, which, however, soon seemed to make the suffering greater. The pain increased so much, that the patient, in desperation, thought of suicide. At the worst, quinine every now and then gave relief. A new physician was called in. All other remedies having failed,

Bad Schmalbach was recommended, when all at once the teeth were thought of. The patient went to a dentist, and had, on the side she was suffering so much pain on, the worst tooth drawn. Here and there, latterly, she had felt a slight drawing in the neighbourhood of the lower part of the cheek, and a slight swelling of the sub-maxillary gland on this side, pointed also to this tooth, the second lower molar. The following night the patient slept quietly for the first time. It seemed as if the whole of this dreadful illness had disappeared. I could learn nothing nearer about the condition of the tooth. Let it be noticed, that, during the whole period of suffering, which lasted a year and a half, all other functions remained undisturbed.

Amongst the symptoms associated with intermittent fever, toothache often occurs. In such cases toothache bring only one of the symptoms associated with the fever, when the cause, that is the fever, disappears, the toothache no longer remains. In our case, however, the toothache was the cause, and the intensity of the symptoms producing fever in which the whole body sympathized, must be put down to the great nervousness of the patient. That great disturbances in other functions of the body did not take place during the long continuance of the disease, for example, in the digestive and nutritive organs as would have done in real intermittent fever, shows plainly that the neuralgia and appearance of fever were merely symptoms. With regard to the swelling of the spleen, I think that those most accustomed to make a diagnosis may sometimes err.

In relating these four cases, I wish principally to show that the attention of doctors should be directed more to the importance of the teeth. Very often, to the great injury of the poor patient, the attention to the teeth is very slight, even preventing the patient having his teeth attended to.

Mr. OAKLEY COLES will, we understand, commence his Class for the Preparation of Candidates for the Dental Diploma, on *Friday, October 2nd*, at 8 o'clock.

ODONTOMES.

(Traité des Tumeurs. Par Paul Broca).

ODONTOMES GENERALLY.

(*Continued from page* 116.)

V. HISTORICAL.

I shall likewise mention a specimen presented to the Anatomical Society in December, 1856, by M. Eug. Nelaton, the nephew, and then pupil, of the Professor of the Clinical Hospital. This complicated specimen (which appears to me to be a curious transition between dental cysts and odontomes) consists of a sort of pouch, whose roof, very thick at certain points, encysts a soft substance formed of epethelial products. In the thickest part of the roof there are eight cords, or cylindrical bodies, spread out in a kind of bouquet having a common pedicle; many enclose small ossiform concretions, and, besides, three of them continue with the fang of a well-formed canine tooth, entirely enclosed in the thickness of the roof. M. Eug. Nelaton admitting rightly that it was a question of a cyst formed in a dental follicle, supposes that these eight cylindrical bodies were so many little dental follicles of new formation developed round the former one, and probably constituting "a case of multiple dentition in one alveolus."* This interpretation, besides being presented under a dubious form, does not appear to me to be acceptable; the connection of the cylindrical bodies with each other and with the fang of the canine tooth, prove that they were not multiple follicles, bnt merely bulbs resulting from hypertrophy of a normal bulb and its subdivision into eight secondary bulbs. It is not less certain that M. Eug. Nelaton has had the advantage of proving for the first time the presence of transitory tissues of the teeth in an accidental production. It was a long way from the discovery of odontomes, but we must recognise the difficulty of making this discovery upon a specimen which was not a true odontome.

We now arrive at the first positive observation of a non-dentified odontome. In the month of June, 1859, M. Letenneur, corresponding member of the Surgical Society at Nantes, practised upon a child of 12 years enucleation of an enormous tumour of the lower jaw. This tumour appeared to him to be fibrous, but the singular connec-

* Bulletins de la Société anatomique, 2e série, t. I., p. 489—491 (1856).

tion which it had with the dentition period, manifestly distinguished it from ordinary fibroma, and M. Letinneur was thus led to consider it as the consequence of a disease of "the alveolar dental organs," this, the title of the observation which he sent with the specimen to the Surgical Society through M. Forget proves. This is the title which was published from the sitting of the 17th of August, 1859:—*Fibrous tumour of the lower jaw, due to the pathological development of the alveolar dental organs; considerable hypertrophy of these organs; hyperostosis and sequestration of the alveoli.**

This diagnosis, established by M. Letenneur after an examination with the naked eye, was soon confirmed by microscopic observation. Before presenting the specimen to the Society, M. Forget begged M. Robin to examine it, and he made an abridged notice, which was published in the verbal-process of the sitting of the 24th of August.† But on the evening of this day, M. Robin read before the Academy of Medecine a more extended notice, entitled—*Upon a particular variety of tumour arising from dental follicles.*‡

"The question is said to be concerning a tumour, which, examined simply with the naked eye, would be considered an ordinary fibrous tumour; a tumour, which, studied by an anatomist who did not know the successive fœtal modifications of the tissues of the dental bulbs and of the enamel organ, would be considered, properly speaking, as a fibro-plastic tumour." But M. Robin was then preparing the great history which he published the following year with M. Magitot, upon "The Genesis and Development of the Dental Follicles." All the phases of the development of the bulbs were familiar to him, and it was easy to him to prove that the structure of this tumour was identical with that of the bulbs before dentification. Many teeth of the second dentition, irregularly united in the tumour, rendered this diagnosis certain; but twice already, before this epoch, M. Robins had occasion to study tumours of the same structure, which he considered to be hypertrophical dental bulbs, although they were without apparent connection with the dental organs, and although the deter-

* Bulletins de la Soc. de Chirurgic, 1re série, t. x., p. 48, Aug. 17, 1859.
† Loc. cit., p. 60.
‡ Bulletins de l'Académie impériale de medecine.

mination of their origin only rested on the nature of their tissue.*

In comparing this note with the reflections submitted by M. Forget to the Surgical Society at the end of M. Letenneur's communication, we must perceive that M. Letenneur and M. Forget have only glanced at a fact that M. Robin had clearly determined. M. Letenneur has attributed the formation of the tumour to an hypertrophy of the fibrous elements of the alveolo-dental organs, and M. Forget to a "hypertrophied transformation of the fibrous elements into which enter the composition of the alveolo-dental organs,"† whilst M. Robin, besides specifying, has put the dental bulbs as the cause, and has consequently discovered the true seat of the affection. Let us not forget also, the two facts that M. Robin had previously observed. He did not only mention them in his account before the Academy, but has since that time exhibited them with all details, before the Society of Biology, in his history of "a kind of tumour formed at the expense of the dental bulbs."‡

The first part of this important work, is devoted to the study of dental bulbs; we find in particular, the description of little heaps of calcareous substance which appear in the tissue pulp towards the period of dentification, and which I designated above under the name of dental grains. These small bodies already seen by Perkinje, and Raschow in different animals, and by Henle in the human adult, up to that time, appeared to have been of slight importance. M. Robin described them more completely, determined the time of their appearance, showed that they constantly existed at all ages in the dental pulp, and finally found them in an innumerable quantity in certain tumours of the bulbs. After having given a precise anatomical basis to the pathological question, M. Robin devoted the second part of his work to the description of "tumours arising from dental bulbs." This description rests solely on the study of M. Letenneur's specimen, and two other older

* Ibid, p. 1210. These two tumours both removed by M. Nelaton, have been described by M. Robin in a later history.

† Bulletins de la soc de chirurgic, 1859, t. x , p. 59. M. Forget has since reprinted the account which he communicated to the Surgical Society, adding to it a beautiful lithographic plate, see Forget *Etude histologigue d'une tumeur fibreuse non decrite de la mâchoire inférieure*, Paris, 1861, broch. in.—4.

‡ Mémoires de la Société de biologie, 1862, 3re. série, t. iv., p. 199—221.

specimens from M. Nelaton's clinic. With such restricted materials, M. Robin could not give a complete description of tumours of the dental bulbs, alike in their origin and nature, but very different in their exterior aspect, and not less so in their accessory elements. That which is common to these two varieties, and which allows them to be united into a single group, is their fundamental substance, similar to that of the dental bulbs; but that in which they differ is the relative proportion of the little calcareous concretions or dental grains, which rare, and thinly sown in tumours of the first variety, as they are in the normal bulb, are, on the contrary, so numerous, and so close together in tumours of the second variety, that they give the pathological tissue quite a peculiar aspect, "which may be compared to that of the potatoe, or to any other body rich in sediment."

This distinction is perfectly grounded. M. Robin, who already in 1855 had recognized the existence of definite dental tissues in M. Forget's dentified odontoplastic odontome, has now discovered the two forms which are presented by non-dentified odontoplastic odontomes. But what has escaped him is their common origin, the strict kindred and filiation of both the dentified and non-dentified odontomes. At the point where his researches had conducted science, the discovery of this kindred and filiation was promised to him who had the good fortune to be the first to study an odontome in the course of dentification. The specimen which I presented to the Surgical Society, on the 10th of June, 1863, and that I had also submitted to M. Robin, allowed me to study dentification in its first appearance in an odontoplastic odontome, and to prove, moreover, the phenomenon of the multiplication of the bulbs, which explains the singular distribution of dentine and enamel in dentified odontomes.

I was thus led to recognise that dentified odontomes are only the last stage of evolution in soft primitive tumours, and are constituted by hypergenesis of different elements of the dental bulbs. To prove the exactness of this theory, I have sought both in collections of observations and in museums for facts more or less analogous to those which have furnished my point of departure. I found a great number, and at first I was struck by the great diversity of these tumours, as variable in their form as in their con-

sistence and structure. The study of the successive phases of the evolution of the dental follicles, has furnished me with an explanation of all these peculiarities, but at the moment when I believed I had arrived at the end, another series of facts, borrowed from veterinary pathology, appeared to put my first conclusions at fault. The remarkable dental tumours in the museum at Alford, which the politeness of my friends, Professors Bauley and Gaubeaux, allowed me to study at my leisure, showed a very different structure to that which the human subject presents in the corresponding conditions of the series of odontomes. The cemental productions, especially, play a part and occupy a situation which is quite in contradiction with the facts of the human odontogenic, and sometimes even with the notions of odontology found in the treatises of veterinary anatomy. But a deeper investigation into the development of the teeth of the herbivoræ soon dissipated these contradictions. The facts of comparitive pathology once explained, have fully confirmed the theory which they at first appeared to disprove, and the great variety of their types allowed me, besides, to complete the series of tumours developed at the expense of the dental bulbs.

It is thus that I have been able to constitute the groups of odontomes and submit them to a classification, based upon the succession of the phases of evolution of the dental follicles, a classification which later facts may perhaps render insufficient, or even defective in some points, but of which the most essential part will, I trust, be preserved.

I have striven in this historical sketch to do justice to the works of predecessors, and in concluding, I have much pleasure in saying that if my own observations have realized any progress, I am greatly indebted to the precise notions of odontomes which M.M. Robin and Magitot have given in their large history of "The Genesis and Evolution of the Dental Follicles."

FOSSIL EDENTATES.

Professor O. C. Marsh, in the current nmber of the *American Journal of Science*, describes some new fossil mammals, being edentates of a stupendous size. They go back very much farther, geologically, than any American species previously described. Some of them are from the Upper Eocene of Wyoming Territory.

THE SURGERY OF THE MOUTH,

By FRANCIS MASON, F.R.C.S.,

SENIOR ASSISTANT-SURGEON AND LECTURER ON ANATOMY AT ST. THOMAS'S HOSPITAL.

(*Continued from vol.* 3, *page* 112)

DISEASES OF THE ANTRUM (*continued*).

D. FOREIGN BODIES IN THE ANTRUM.

Considering how exposed to external injury the face is, it is a matter of surprise that disease of the antrum, in some form or other, should not be more commonly met with. The reason of this immunity appears to be that the cavity is remarkably well protected, especially by the prominent malar bone. In gun-shot injuries, whether in civil or in military practice, this part is frequently implicated, and we find it the receptacle of a variety of foreign bodies, the result of such injuries. Soon after the Crimean War, I had the privilege of assisting Sir W. Fergusson at operations on many of the officers and others who had been wounded in that engagement, and in most of the cases the bones of the face were in some way involved, bullets, necrosed bone, or other materials, being found imbedded in the cavity of the antrum. In all these was the characteristic discharge from a fistulous opening in some part of the cheek, a probe in most cases, detecting the presence of the foreign body.

As I have already remarked, *a tooth* may occasionally be found in the antrum. The dentist is familiar with cases in which, in attempting to extract a stump, it has been accidentally pushed into the cavity. Mr. Cattlin refers to such an example that occurred in his own practice,* and I have already noticed† the case of a man aged 35, who, after a fall, lost his right upper lateral incisor, which was found three and a half years after in the antrum. Velpeau,‡ in speaking of diseases of the maxillary sinus, remarks, "it is unnecessary to say, that, should any deviated tooth be the cause of the disease, it would be necessary to proceed in search of it, and to extract it immediately. The triumphs of art contain, in this respect, facts that are extremely curious. Such is that which Dubois has pub-

* *Brit. Med. Journal*, June 21, 1858.

† *Monthly Rev. of Dental Surg.*, vol. 3, p. 30.

‡ Velpeau's Op. Surgery Mouth, vol. 3.

lished. This practitioner, supposing he was cutting down on a fungous tumour, saw issue out nothing but a liquid, and thin matter from the maxillary sinus which he had just freely laid open. The wound soon closed up, but the tumour remained. With the assent of Pelletan and Boyer, Dubois extracted three teeth, removed a large portion of the alveolar border, and thus laid open the antrum in its whole extent. No fungus was found, but he perceived in the upper part of the cavity, in the substance of its anterior wall, a white point, which was no other than an incisor tooth, the root of which was found to be rivetted as it were, into the sinus." Again Bordenave narrates the following case:*—"In 1747," he says, "I saw at the Charité Hospital in Paris, a man who had a fistulous opening in the right cheek, from which protruded the point of a long nail. This foreign body had been fired from a gun, and passed head foremost through the patient's cheek into the sinus, and thus caused a fistula. M. Foubert removed the nail, and a cure was effected, during which some small exfoliation took place."

A piece of a *dead bone* may also be the foreign body, as in the interesting case under the care of Mr. H. Smith, which I have already cited.†

A somewhat similar case was under my own observation in 1872. The patient was a man aged 40, who was struck on the left cheek, two years previously, by an oar. There was some inflammation at the time of the accident, which subsided leaving a thickening over the outer part of the malar bone. Subsequently an abscess formed which burst spontaneously under the zygoma; the discharge continued, and at the time I saw him I could pass a probe for some distance in the direction of the antrum. On pressing the anterior wall of the cavity from the mouth, great pain was experienced, I therefore made a free opening in this situation and removed three or four small pieces of loose necrosed bone. In this case the antrum was injected with a solution of Condy's fluid only. The fistulous opening under the zygoma speedily healed, and the patient made a good recovery.

The urgent symptoms, in some instances, come on many years after the accident; thus, Sir Benjamin Brodie refers,

* Bordenave on "Diseases of the maxillary sinus," Syd. Soc. trans., 1848.

† *Monthly Rev. of Dental Surg.*, vol. 3., p. 33.

in a clinical lecture, to a case of necrosed bone in the left antrum: it was traceable to a fall the patient had eight years previously.*

Again, BULLETS or portions of wad may act as foreign bodies, and they have been known to remain in the antrum for years without producing any symptoms whatever. Occasionally they come away of their own accord, as in a circumstance related by Macleod, "A round ball had entered close to, but below the inner canthus of the eye, and being lost was not further thought of. The wound healed, and the patient had almost forgotten the circumstance, when after suffering slightly from dryness of the nostril, the ball fell from his nose to his great alarm and astonishment several months afterwards. This case is singular from the absence of fœtid discharge which usually attends such of bones, with a retained ball."†

The reader is aware that the same thing happens in other parts of the body, as for example, in injuries of the chest. Thus Erichsen‡ quotes Hennen, "who states that a bullet has been lodged in the chest for upwards of twenty years, and Vidal mentions a man who lived for fifteen years with the broken end of a foil in his chest, which, after death, was found sticking in the vertebræ, and stretching across to one of the ribs." The museum of the Royal College of Surgeons affords abundant illustrations of these points. With regard to giving an opinion as to the nature of the foreign substance before undertaking an exploratory operation, it may be mentioned that the symptoms are, in most cases, fairly uniform, and that it is almost impossible to state positively whether the foreign body be of hard or of soft material. Generally there is a history of injury, and a fistulous opening is usually found which discharges, at times, a most offensive pus. In a case that was under my care at St. Thomas' Hospital, the antrum was found, at the operation, full of soft pultaceous matter, and although there was a fistulous opening in the cheek, there was nothing to indicate the exact character of the contents of the antrum. However, it is of little consequence so far as the operative procedure is concerned; the surgeon should, in these cases, open up the front wall of the antrum, through

* *London Medical Gazette*, Dec. 16, 1834.
† *Philadelphia Medical and Surgical Reporter*, 1865.
‡ Science and Art of Surgery.

the mouth, and clear the cavity of any extraneous substance; sometimes there is smart bleeding, but this soon ceases by the application of iced water. The details of the operation will be more fully entered upon in subsequent papers. After the operation, it is well to keep the cavity well cleansed with warm water injected several times a-day, or a solution of Condy's fluid, or carbolic acid, or zinc, or sulphate of copper, or other substances may be employed. Sir Benjamin Brodie recommends, for diseases of the antrum, the blue lint, *i.e.*, lint dipped in a solution of copper. In most instances, the surgeon is called upon to interfere, and perhaps there is no class of cases in which his art is shown to better advantage. His duty is to remove the foreign body, if it give rise to irritation, and take especial care to disfigure the patient as little as possible.

EXOSTOSIS OF THE ANTRUM.

Exostosis involving the antrum occasionally occurs, and may be distinguished by its extreme hardness. It is stated to be, in some cases, traceable to syphilis. M. Bordenave* gives an interesting description of a specimen of exostosis which was accidentally discovered by some grave-diggers in 1767—"The exostosis occupied all the right maxillary sinus; it measured nearly six inches from the orbit to the lowest part, and its circumference at the largest part was about a foot. The tumour projected on the left side almost to the left malar bone. Externally, it was smooth and polished and very hard; within, it looked like pumice stone. It is probable," he adds, "that during life the acts of swallowing and respiration were much impeded, and that the lower jaw could not masticate."

There are instances recorded, in which osseous growths in the antrum have separated without surgical interference, but they are of rare occurrence. Mr. Stanley met with such a case.† Baron Boyer‡ makes mention of two instances of the kind. Another case has been recorded by Mr. Hilton, in which a large ivory exostosis separated spontaneously from the bone of the face.‖

* *Loc cit*, p. 193.

† *Medical Times*, vol. 20, 1849, p. 395.

‡ "Traite des Maladies Chirurgicales," tom. 3, p. 334.

‖ "Guy's Hospital Reports," Sept., 1836.

INSECTS IN THE ANTRUM.

To sum up the principal diseases of the antrum, I must not omit to say a few words on insects in that cavity. Such a condition must be exceptionally uncommon. Insects have been found in the other bony sinuses, thus Mr. Holden* refers to a case mentioned by Blumenbach, of a lady who had a kind of wood louse (scolopendra electrica), for a whole year in one of her frontal cells. Bordenave, too,† alludes to the possibility of worms passing from the nose into the maxillary sinus, and quotes Fabrician Hildanus, who relates "that an infant had severe pains in the head, and was only freed from them after having expelled by sneezing a quantity of fœtid matter and a large worm." The following is another example.‡ "A woman, aged 60, was subject to acute pains in the antrum, which were more acute in winter than in summer. She was subjected to all kinds of treatment, and had all the teeth of the affected side removed. At length, the antrum was opened with no benefit, but on the fifth day a dead insect was extracted by means of a pair of forceps."

In the next paper I shall speak of caries and necrosis of the bones of the face.

INFORMATION FOR STUDENTS.

THE information contained in the following pages is intended for those who propose taking the Diploma in Dental Surgery of the Royal College of Surgeons of England. Those who prefer seeking also the Membership of the College will obtain all the necessary particulars as to Hospitals, &c., in the Students' Number of the MEDICAL PAPERS for the 12th inst.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.

REGULATIONS RELATING TO THE DIPLOMA IN DENTAL SURGERY.

EDUCATION.

Candidates are required to produce the following Certificates:—

* "Human Osteology."

† *Loc. cit.*

‡ "Cooper's Surgical Dictionary," vol. i. p. 252.

1. Of being twenty-one years of age.
2. Of having been engaged during four years in the acquirement of professional knowledge.
3. Of having attended, at a School or Schools recognized by this College, not less than one of each of the following Courses of Lectures, delivered by Lecturers recognized by this College, namely:—Anatomy, Physiology, Surgery, Medicine, Chemistry, and Materia Medica.
4. Of having attended a second Winter Course of Lectures on Anatomy, or a Course of not less than twenty Lectures on the Anatomy of the Head and Neck, delivered by Lecturers recognized by this College.
5. Of having performed Dissections at a recognized School during not less than nine months.
6. Of having completed a course of Chemical Manipulation, under the superintendence of a Teacher or Lecturer recognized by this College.
7. Of having attended, at a recognized Hospital or Hospitals in the United Kingdom, the Practice of Surgery and Clinical Lectures on Surgery during two Winter Sessions.
8. Of having attended, at a recognized School, two Courses of Lectures upon each of the following subjects, viz.: —Dental Anatomy and Physiology (Human and Comparative), Dental Surgery, Dental Mechanics, and one Course of Lectures on Metallurgy, by Lecturers recognized by this College.
9. Of having been engaged, during a period of not less than three years, in acquiring a practical familiarity with the details of Mechanical Dentistry, under the instruction of a competent Practitioner.
10. Of having attended at a recognized Dental Hospital, or in the Dental department of a recognized general Hospital, the Practice of Dental Surgery during the period of two years.

N.B. The Students of the London Schools are required to register the above Certificates at this College; and special Returns will be required from the Provincial Schools.

EXAMINATION.

The examination is partly written and partly oral.

The written examination comprises General Anatomy and Physiology, and General Pathology and Surgery, with especial reference to the practice of the Dental Profession.

The oral practice examination comprises the several subjects included in the curriculum of professional education, and is conducted by the use of preparations, casts, drawings, &c.

Members of the College, in the written examination, will only have to answer those questions set by the Section of the Board consisting of persons skilled in Dental Surgery; and in the oral examination will be examined only by that Section.

A Candidate whose qualifications shall be found insufficient will be referred back to his studies, and will not be admitted to re-examination within the period of six months, unless the Board shall otherwise determine.

Examinations will be held in January and June.

The fee for the Diploma is Ten Guineas, over and above any stamp duty.

NOTE.—*A ticket of admission to the Museum, to the Library, and to the College lectures will be presented to each Candidate on his obtaining the Diploma.*

Board of Examiners in Dental Surgery.—Henry Hancock, 96, Harley Street; John Hilton, 10, New Broad Street, E.C.; Frederick Le Gros Clark, 14, St. Thomas Street, E.C.; Samuel Cartwright, 32, Old Burlington Street, W.; G. A. Ibbetson, 19, Hanover Square, W.; S. J. A. Salter, 17, New Broad Street, E.C.

EDWARD TRIMMER, *Secretary.*

9th July, 1874.

DENTAL DIPLOMA.

IF the Curriculum for the Dental Diploma be examined, it will be seen that the subjects embraced in it may be arranged under two heads—viz., those which are common to a general Medical education, and those which pertain specially to Dental Surgery.

It was felt by the founders of the London School of Dental Surgery, that the opportunities afforded to the Student at the existing Medical Schools and General Hospitals, for the acquirement of a knowledge of those subjects embraced in an ordinary Medical education, could not be equalled by a special School. While, on the other hand, the opportunities offered by a special School in connection with the Dental Hospital for the instruction of Pupils on the subjects which specially relate to Dental

Surgery, would be much greater than could be secured in an institution devoted to a general Medical education.

Hence in the formation of the London School of Dental Surgery, provision was made for teaching those branches of science only which pertain specially to Dentistry; and the School has been organized in connection with the Dental Hospital of London, in order that practical instruction in subjects specially pertaining to Dental Surgery might be accompanied by systematic teaching, under the conditions enjoined by the Curriculum.

The Hospital was opened on Monday, October 3rd, 1859, for the reception of Pupils, who receive practical instruction from the Dental Officers, and, when sufficiently advanced, are themselves entrusted with the treatment of cases.

HOSPITALS.

DENTAL HOSPITAL.

Dental Officers, and the Days and Hours of Hospital Attendance.

Consulting Physician—Sir Thomas Watson, Bart., M.D.
Consulting Surgeon—Mr. Campbell De Morgan, F.R.S.

		Dental Surgeons.	*Assist.-Dental Surgeons.*
9 a.m.	Monday	Mr. Charles James Fox	Mr. Henry Moon.
,,	Tuesday ,,	Thomas Underwood... ,,	A. George Medwin.
,,	Wednesday... ,,	George Gregson ,,	Charles S. Tomes.
,,	Thursday ... ,,	Alfred Coleman ,,	Edwin F. Lane.
,,	Friday..... ,,	T. H. G. Harding ... ,,	Wm. P. Bartlett.
,,	Saturday..... ,,	Alfred Hill ,,	S. H. Cartwright.

Anæsthetists—Monday, Mr. Bailey; Tuesday and Friday, Mr. Clover; Wednesday and Saturday, Mr. Braine.

Dental House-Surgeon—Mr. David Hepburn.

Fees for two years' attendance, as required by R.C.S., £15 15s.

DENTAL SCHOOL.

SUMMER SESSION.

Dental Anatomy and Physiology (Human and Comparative)—Mr. Charles S. Tomes, M.A., M.R.C.S., L.D.S. These lectures will be delivered Wednesdays and Saturdays, at 8 A.M.

Dental Surgery and Pathology—Mr. S. H. Cartwright, M.R.C.S. These lectures will be delivered on Monday and Thursday, at 8 o'clock A.M.

WINTER SESSION.

Mechanical Dentistry—Mr. Turner, M.R.C.S. These

lectures will be delivered on the evenings of Wednesday, at 7.

Metallurgy in its Application to Dental Purposes—Mr. G. H. Makins, M.R.C.S., F.C.S. These lectures will be delivered during the month of October and November, on Tuesday and Friday, at 6.30 P.M.

Fees for Lectures, as required by R.C.S., £15 15s.

Fees to Single Courses.—Dental Anatomy and Physiology, one course, 3 guineas; two courses, 5 guineas. Dental Surgery, one course, 3 guineas; two courses, 5 guineas. Dental Mechanics, one course, 3 guineas; two courses, 5 guineas. Metallurgy, one course, 3 guineas; two courses. 5 guineas. Students who perform operations for filling teeth must provide their own instruments for the same. Further particulars may be obtained on application to the Dental Officer of the day, or the Dean, Mr. T. A. Rogers.

RULES AND REGULATIONS TO BE OBSERVED BY STUDENTS OF THE DENTAL HOSPITAL OF LONDON.

1. *Students entering the practice of this Hospital shall (unless exempted for special reasons) do so upon the understanding that it is their intention to obtain the Dental Diploma of the Royal College of Surgeons of England. Before commencing their course of Studies they must sign their names as willing to conform to this rule and the following regulations.*
2. *Students must attend the Hospital daily (except Sunday), at 9 o'clock a.m., and upon entering the Hospital must sign their names in the Attendance Books. The attendance of Students will be submitted monthly to the Medical Committee, and no Schedules will be signed unless their attendance on Hospital practice and at Lectures has been satisfactory.*
3. *No Student shall, unless specially authorized, undertake any operation during the first two months of his Hospital Practice. When permitted to undertake operations for filling teeth, he must provide the instruments requisite for the same. For all cases of gold filling, permission must be obtained of a Medical Officer.*
4. *No Student shall, under any circumstances, receive fee or remuneration from any patient attending, or to whom he may become known whilst attending the Hospital, and no mechanical work in the form of artificial teeth shall be supplied to a Patient by a Student of the Hospital.*
5. *Students must be punctual in their appointments with Patients; when otherwise, cases, previously under their care, will be entrusted to other Students by the Medical Officers.*
6. *No Student shall make use of the same Operating Chair for Patients consecutively whilst other Students are unoccupied for want of the same.*
7. *All instruments and appliances the property of the Hospital shall, after*

having been used by a Student, be returned cleansed to their proper places.

8. *Students must consider themselves strictly under the control of the Medical Officers of the Hospital. All unnecessary conversation must be avoided, and quietude and gentlemanly bearing before the Patients observed.*
9. *Any exemption from fully carrying out Rules* 1, 2, *and* 3, *can only be obtained from the Medical Committee upon grounds that may appear to them good and proper for granting such exemption.*

NATIONAL DENTAL HOSPITAL, GREAT PORTLAND STREET.

The practice of this Hospital is recognised by the Royal College of Surgeons for the Dental Diploma. The hospital is open daily (Sundays excepted) for the reception of patients, at 9 A.M. Fee for two years' attendance on the practice of the hospital, as required by the curriculum of the College of Surgeons, £12 12s.

Hospital Staff.

Consulting Physicians—F. W. Pavy, M.D., B. W. Richardson, F.R.S., M.D.

Consulting Surgeons—Prof. Erichsen, F.R.C.S., Spencer Wells, Esq., F.R.C.S.

Consulting Dental Surgeon—J. Merryweather, Esq.

Dental Officers—Mr. A. Hockley, L.D.S., Mr. J. Steele, L.D.S., Mr. G. Williams, L.D.S., Mr. W. Perkins, L.D.S., Mr. H. T. Kempton, L.D.S., Mr. Harry Rose, L.D.S.

Assistant-Dental Surgeon—Mr. G. Gingell, L.D.S.

Hon. Sec.—A. Hockley.

DENTAL DISPENSARY, CATHERINE STREET, PLYMOUTH.

Physician—C. Albert Hingston, Esq., M.D. London.

Surgeon—Warren J. Isbell, Esq., L.R.C.P. Edin., F.R.C.S.

Consulting Dentist—Stratton J. Coles, Esq.

Dentists—F. A. Jewers, Esq.; W. V. Moore, Esq., D.L.R.C.S.; C. Spence Bate, Esq., F.R.S., D.L.R.C.S.; Francis H. Balkwill, Esq., D.L.R.C.S.

Treasurer—Alfred Payne Balkwill, Esq.

Hon. Sec.—E. Gasking Bennett, Esq.

The Dentists attend at 9 o'clock on Mondays, Wednesdays, Thursdays, and Saturdays, to stop, regulate or extract teeth, or to adopt such other course as the necessity of the case may suggest.

DENTAL SCHOOL.

Certificates of attendance on the practice of this Dental Dispensary are recognised by the College of Surgeons as qualifying for the Diploma in Dental Surgery. The College will also recognise lectures delivered at the Dental Dispensary, Plymouth. Pupils of any of the Dental Surgeons of the Plymouth Dental Dispensary, or other Dentists holding a Diploma of the College of Surgeons, or Member of the Odontological Society, may attend the Dispensary on the day of such practitioner as may agree to accept such pupil or pupils, on the payment of £1 1s. per annum to the institution.

GENERAL HOSPITALS.

King's College.

DENTAL SURGERY.

Dental Surgeon—S. Cartwright, Esq., F.R.C.S.
Assistant Dental Surgeon—S. Hamilton Cartwright, Esq., M.R.C.S.

Courses of Lectures on Dental Anatomy and Physiology, Dental Surgery, Mechanics and Metallurgy, are given during the Summer Session. The fee for the special Course of Dentistry is 15 guineas. Special Certificates of attendance on the Dental Practice of the Hospital will be given on payment of an extra fee of 5 guineas. During the month of March, Lectures on the Anatomy of the head and neck will be given by the Professor of Anatomy, with a special view to the convenience of the students of Dental Surgery. Lectures on Metallurgy, with the same object, will be given by the Professor of Chemistry during the month of February.

Students in Dental Surgery are divided into two classes. 1. Those who having attended the course of Study required for qualifying as a medical student, afterwards take up the following Special Course of Dentistry, viz.:—One course of Dental Anatomy and Physiology, ditto Surgery, ditto Mechanics, ditto Metallurgy, 15 guineas; two years Dental Hospital Practice, 15 guineas; amounting to £31 10s. 2. Those who only take up the curriculum required by the College of Surgeons for their Dental Diploma. These students must attend Anatomy, Physiology, Chemistry, Medicine, Surgery, Materia Medica, Practical Chemistry, Surgical Practice, two Winter Sessions, Special Dentistry

Course (as above). The charge for this course will be £95 1s. 6d., if paid in one sum on entrance; or £100 if paid by the following instalments: viz., £60 on entrance, and £40 at the beginning of the second Winter Session. 3. Each student of the Special Dentistry Class must provide himself with a proper set of instruments, and will have to pay for the more expensive materials used by him in the course of his Dental practice. 4. The Special Lectures in Dentistry are given during the summer Session.

KING'S COLLEGE DENTAL DEPARTMENT.

On enquiry we find that the Lectures on Dental Anatomy and Physiology will be given by Professor Curnow. Those on Dental Surgery by Professor Cartwright. Those on Dental Mechanics by Mr. S. Hamilton Cartwright. And those on Metallurgy by Professor Bloxam.

MIDDLESEX HOSPITAL.

Dental Surgeon—J. Tomes, Esq., F.R.S.

Assistant Dental Surgeon—J. Turner, Esq., M.R.C.S., L.D.S.,

Fees for the Lectures required by the Royal College of Surgeons, forty guineas, either in one payment or by instalments of twenty-five guineas on entrance, and fifteen guineas at the beginning of the second winter session. Pupils receive instructions on Diseases of the Teeth and the Operations connected with them, daily at 9 A.M. Fee, £5 5s. Further information may be obtained from Dr. John Murray.

UNIVERSITY COLLEGE HOSPITAL.

Dental Surgeon—G. A. Ibbetson, Esq., F.R.C.S., L.D.S., Lecturer on Dental Anatomy and Physiology, is giving a course of twelve lectures at University College on Tuesdays and Thursdays at 5 P.M., beginning in January. Fee, £2 2s. These lectures are recognised by the Royal College of Surgeons for the Diploma in Dental Surgery.

ST. BATHOLOMEW'S HOSPITAL AND COLLEGE.

Dental Surgeon and Lecturer—Alfred Coleman, Esq., L.R.C.P. London, F.R.C.S., L.D.S., Dental Surgeon to the Dental Hospital of London.

Lectures on Dental Surgery, Anatomy, Physiology and Pathology during winter Session; the fee for one course is £2 2s.; unlimited, £3. 3s. These lectures are recognized by the Royal College of Surgeons as a course on Dental Surgery required for the Dental Diploma. The fee for general subjects for Dental students for the first winter is £26 5s., for the first summer £26 5s., or a single payment of £52 10s. The practice of the Dental department of this Hospital is recognized by the Royal College of Surgeons.

Westminster Hospital.

By J. Walker, M.R.C.S. and L.D.S., Dental Surgeon to the Hospital.

Wednesdays, at 9.30 *a.m.* (*in Oct., Nov., and Dec.*).

Fees: One Course, Two Guineas; Two Courses, Three Guineas. Free to Students of the Hospital, unless a Certificate is required.

This Course of Lectures will include the Development and Microscopic Characters of the Teeth—The Eruption of the temporary and permanent Teeth, with the incidental diseases—The mode of treating and avoiding Irregularities of the permanent Teeth—Diseases of, and Operations on, the Teeth.

The Lectures will be illustrated by Models, Specimens, and Diagrams.

GENERAL FEES FOR DENTAL STUDENTS.

The Fees for the *general* Surgical Practice and Lectures required for the Dental Diploma of the Royal College of Surgeons, are as follows:—

	1st Session.	2nd Session.	3rd Session.
	£ s. d.	£ s. d.	£ s. d.
Surgical Practice and Clinical Lectures (two winters)	8 8 0	...	4 4 0
Anatomy and Dissections	7 7 0	...	2 2 0
Physiology	5 5 0	...	...
Chemistry	5 5 0	...	...
Materia Medica	...	3 3 0	...
Practical Chemistry (with materials) ...	...	3 3 0	...
Medicine	...	...	5 5 0
Surgery...	...	...	5 5 0
	26 5 0	6 6 0	16 16 0
Deduct Composition to General Students ...	1 15 0	0 11 0	1 6 0
Total: in three payments, one at the commencement of each of the first three Sessions	24 10 0	5 15 0	15 10 0
Or in two payments, one at the commencement of each Academic Year	27 10 0	...	15 10 0
Or in one sum on entrance (not perpetual)...	38 0 0	...	...

We notice in the prospectus of Westminster Hospital for the forth-

coming session, 1874-75, the following section of the Dean's report:—"It has been suggested that steps should be taken to complete the Dental Department of the Hospital and School by the appointment of a second Dental Surgeon, and by the establishment of courses of Lectures on Dental Anatomy and Physiology, Dental Mechanics and Metallurgy. The object is to enable such dental students as desire to do so, to attend all their classes at the Westminster Hospital, and thus avoid the waste of time which is incurred by constantly going to and fro between two Hospitals. The matter is under consideration."

This would be, without doubt, a step in the right direction with regard to the welfare of the School, and should the Lecturers establish courses of Lectures on all the subjects required by the College of Surgeons for the Dental Diploma, we are sure it would be a boon to those students who availed themselves of them.

If the suggestion be carried out, not a little of its success would depend upon the hours appointed for the Lectures, so that attendance at them would not interfere with the Dental Hospital practice of those students who would so arrange their studies.

We further notice an increase in the amount of fees for the general surgical practice and lectures for the Dental Diploma. For the sessions commencing from 1872-73 the total fee was £30; an advance of £6 was made last year, and this year there is a further advance of £2. We presume the lecturers have made this second advancement on the fee of 1872-73 partly on account of the increased expenditure which will be incurred in the working of the new physiological laboratory, which is to be opened on October 1st.

Charing Cross.

Dental Surgeon—J. Fairbank, Esq., M.R.C.S., who attends at the Hospital three days a week for Dental operations. A course of lectures on Dental Surgery is also given during the summer months. The Composition fee for Dental Surgery, including Matriculation, is £42 2s.

Guy's Hospital Medical and Surgical School.

Dental Surgeon—J. Salter, Esq., F.R.S. Assistant Dental Surgeon, H. Moon, Esq.

Practical instruction in Dental Surgery is given every Thursday at 12 o'clock.

St. George's Hospital.

Dental Surgeon—Charles Vasey, Esq., L.D.S. Mr. Vasey attends at the Hospital on Tuesdays and Saturdays from 9 to 10, and on Thursdays at 1 o'clock. Lectures on Dental Surgery are given by Mr. Vasey in the summer session. Fee, £1 1s. Gentlemen will be admitted to the lectures

and Hospital practice required for the Diploma in Dental Surgery by one payment of £45.

LONDON HOSPITAL MEDICAL COLLEGE.

Dental Surgeon—Barrett, Esq., M.R.C.S.

Mr. Barrett gives practical instructions on Tuesdays at 10 A.M. Fee, £2 2s. The lectures are delivered in March at 5 P.M. By Mr. H. J. Barrett, late Dental Surgeon.

ST. MARY'S HOSPITAL MEDICAL SCHOOL.

Dental Surgeon—H. Howard Hayward, Esq., M.R.C.S., L.D.S.

Practical instruction in Dental operations is given on Wednesdays and Saturdays at 9.30 A.M. Also a special course of lectures in Dental Surgery. Fee for the course, £2 2s.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.

REGULATIONS RESPECTING THE EDUCATION AND EXAMINATION OF CANDIDATES FOR THE DIPLOMA OF MEMBER OF THIS COLLEGE.

SECTION I.

Preliminary General Education and Examination.

I. Candidates who commenced their Professional Education on or after the 1st of January, 1861, will be required to produce one or other of the following Certificates:—

1. Of Graduation in Arts at a University recognised for this purpose.

The following are the Universities at present recognised, viz.:—

Oxford; Cambridge; Dublin; London; Durham; Queen's University in Ireland; Edinburgh; Glasgow; Aberdeen; and St. Andrew's.

Calcutta; Madras; and Bombay.

Canada—McGill College, Montreal: and Queen's College, Kingston.

2. Of having passed an Examination for Matriculation, or such other Examination as shall, in either case, from time to time be sanctioned by the Council of this College, at a University in the United Kingdom, or at a Colonial or Foreign University recognised by the Council of this College.

The following are the Examinations at present recognised under this Clause (No 2), viz.:—

Oxford.—Responsions or Moderations.

Middle-Class Examinations, Senior, the Certificates to include Latin and Mathematics.

Cambridge.—Previous Examination.

Cambridge.—Middle-Class Examinations, Senior, the Certificates to include Latin and Mathematics.

Oxford and Cambridge.—"Schools Examination Board," the Certificates to include the several subjects required in the Preliminary Examination of the College.

Dublin.—Entrance Examination.

London.—Matriculation Examination.

Durham.—Examination of Students in Arts in their second and first years.

Middle-Class Examinations, Senior, the Certificates to include Latin and Mathematics.

Registration Examination for Medical Students.

Queen's University in Ireland.—Two years' Arts Course for Diploma of Licentiate in Arts.

Preliminary Examinations at end of B.A. Course.

Middle-Class Examinations, the Certificates to include Latin and Mathematics.

Matriculation Examinations.

Edinburgh; Aberdeen; Glasgow; and St. Andrew's.—Preliminary or Extra Professional Examinations for Graduation in Medicine.

Calcutta; Madras; and Bombay.—Matriculation Examinations.

Canada; Queen's College, Kingston.—Matriculation Examination, Preliminary Examination of Students in Medicine; McGill College, Montreal; Bishop's College, Montreal; University College, Toronto; University of Trinity College, Toronto; Victoria College, Toronto; University of Laval, Quebec.—Matriculation Examinations.

Nova Scotia; King's College, Windsor.—Matriculation Examination.—Responsions. New Brunswick; Fredericton.—Matriculation Examination; Dalhousie College and University, Halifax.—Matriculation Examination.

Australia; Melbourne.—Matriculation Examination, with a Certificate that the Student has passed an Examination in Latin. Sydney; Matriculation Examination. Adelaide; South Australian Institute.

University of the Cape of Good Hope.—Matriculation Examination.

New York; Bellevue Hospital Medical College.—Matriculation Examination.

3. Of having passed the Preliminary Examination for the Fellowship of this College.
4. Of having passed the Preliminary Examinations of the Royal Colleges of Surgeons in Ireland and of Edinburgh, or of the Faculty of Physicians and Surgeons of Glasgow.
5. Of having passed the Examination in Arts of the Society of Apothecaries of London, or of the Apothecaries' Hall of Ireland.
6. Of having passed the First-Class Examination of the College of Preceptors.
7. Of having obtained the Testamur of the Codrington College, Barbadoes.
8. Of having obtained the Degree of Associate of Arts granted by the Tasmanian Council of Education, with a Certificate that the Student has been examined in Latin and Mathematics.

9. Of having passed the Voluntary Examinations of Christ's College, Canterbury, New Zealand, the Certificate to include all the subjects required from time to time in the Preliminary Examination of the College

II. Candidates who shall not be able to produce one or other of the foregoing Certificates will be required to pass an Examination, in English, Classics, and Mathematics, conducted by the Board of Examiners of the College of Preceptors, under the direction and supervision of this College.

The following are the subjects of the Examination referred to in the foregoing paragraph for December, 1874, and until further notice, viz. :—

PART I.

COMPULSORY SUBJECTS.

1. Writing from Dictation.
2. English Grammar.
3. Writing a short English composition; such as a description of a place, an account of some useful or natural product, or the like.
4. Arithmetic. No Candidate will be passed who does not show a competent knowledge of the first four rules, simple and compound, of Vulgar Fractions, and of Decimals.
5. Questions on the Geography of Europe, and particularly of the British Isles.
6. Questions on the outlines of English History, that is, the succession of the Sovereigns and the leading events of each reign.
7. Mathematics. Euclid, Books I. and II., or the subjects thereof; Algebra to Simple Equations inclusive.
8. Translation of a passage from the second book of Cæsar's Commentaries, "De Bello Gallico."

PART II.

OPTIONAL SUBJECTS.

Papers will also be set on the following six subjects; and each Candidate will be required to offer himself for examination on one subject at least, at his option; but no Candidate will be allowed to offer himself for examination on more than four subjects:—

1. Translation of a passage from the first Book of the Anabasis of Xenophon.
2. Translation of a passage from X. B. Saintine's "Picciola."
3. Translation of a passage from Schiller's "Wilhelm Tell."

Besides these Translations into English, the Candidate will be required to answer questions on the Grammar of each subject, whether compulsory or optional.

4. Mechanics. The questions will be chiefly of an elementary character.
5. Chemistry. The questions will be on the elementary facts of Chemistry.
6. Botany and Zoology. The questions will be on the classification of Plants and Animals.

The quality of the handwriting and the spelling will be taken into account.

N.B.—Each Candidate [*who has not at a previous Examination paid the amount*] is required to pay a Fee of £2 on the morning of the first day of

the Examination prior to his admission thereto. The next Examination will be held in December. The exact dates of the Examination will be duly advertised, when fixed, in the Journals. Candidates are required to send in the prescribed forms of application not less than three weeks before the commencement of the Examination.

Note.—A Candidate in order to qualify for the Fellowship is required, in addition to the subjects included in Part I., to pass in Greek and in French or German, and in one at his option of the remaining subjects in Part II.

SECTION II.

Professional Education.

I. Professional Studies prior to the date at which the Candidate shall have passed an Examination in General Knowledge in conformity with the Regulation in the preceding Section are not recognised.

II. The following will be considered as the commencement of Professional Education:—

1. Attendance on the Practice of a Hospital, or other Public Institution recognised by this College for that purpose.
2. Instruction as the Pupil of a legally qualified Surgeon, holding the appointment of Surgeon to a Hospital, General Dispensary, or Union Workhouse, or where such opportunities of practical instruction are afforded as shall be satisfactory to the Council.
3. Attendance on Lectures on Anatomy, Physiology, or Chemistry, by Lecturers recognised by this College.

The commencement of professional study, otherwise than by attendance on Lectures in recognised Medical Schools, or by attendance on the Practice of recognised Hospitals, will not be admitted until a Certificate thereof shall be furnished to the Secretary for registration at the College, by the Practitioner whose Pupil the Candidate shall have become, or by the Medical Superintendent of the Hospital or other Institution to the practice of which he shall have entered, and will, consequently, date only from the reception of such Certificate by the Secretary; the Certificate to be accompanied by proof of having passed the necessary Preliminary Examination in General Knowledge.

III. Candidates will be required to produce the following Certificates, viz.:—

1. Of being twenty-one years of age.
2. Of having been engaged, subsequently to the date of passing the Preliminary Examination, during four years, or during a period extending over not less than four Winter and four Summer Sessions, in the acquirement of professional knowledge.
3. Of having attended Lectures on Anatomy, during two Winter Sessions.
4. Of having performed Dissections during not less than two Winter Sessions.
5. Of having attended Lectures on General Anatomy and Physiology during one Winter Session.
6. Of having attended a Practical Course of General Anatomy and Physiology during another Winter or a Summer Session, consisting of not less than thirty meetings of the Class.

Note A.—By the Practical Course referred to in Clause 6, it is meant that the learners themselves shall, individually, be engaged in the neces-

sary experiments, manipulations, &c.; but it is not hereby intended that the learners shall perform vivisections.

7. Of having attended Lectures on Surgery during one Winter Session.
8. Of having attended a Course of Practical Surgery during a period occupying not less than six months prior or subsequent to the Course required by the preceding Clause 7.

Note B.—The Course of Practical Surgery referred to in Clause 8 is intended to embrace instruction in which each Pupil shall be exercised in practical details, such as in

The Application of Anatomical facts to Surgery, on the living person, or on the dead body.

The methods of proceeding and the manipulations necessary in order to detect the effects of diseases and accidents, on the living person, or on the dead body.

The performance, where practicable, of the operations of Surgery on the dead body.

The use of Surgical Apparatus.

The examination of diseased structures, as illustrated in the contents of a museum of Morbid Anatomy and otherwise.

9. Of having attended one Course of Lectures on each of the following subjects, viz. :—

Chemistry.
Materia Medica.
Medicine.
Forensic Medicine.
Midwifery (with practical instruction, and a certificate of having personally conducted not less than ten labours).
Pathological Anatomy during not less than three months.

Note C.—The Course of Lectures on Chemistry included in Clause 9 will not be required in the case of a Candidate who shall have passed a satisfactory Examination in this subject in his Preliminary Examination.

10. Of having studied Practical Pharmacy during three months.
11. Of having attended a three months' course of Practical Chemistry (with manipulations), in its application to Medical Study.
12. Of Instruction and Proficiency in the Practice of Vaccination.

Note D.—In the case of Candidates who commenced their Professional Education on or after the 1st of October, 1868, the Certificate of Instruction in Vaccination will only be received from recognised Vaccine Stations, or from recognised Vaccine Departments in Medical Schools or Hospitals, or other Public Instituions, where the appointed Teacher of Vaccination is not liable to frequent change, and where ample means for study are provided by not less than such a number of cases (eight or ten on an average weekly) as may be found, after due inquiry, to be sufficient for this purpose at each place.

Note E.—The Certificates of attendance on the several Courses of Lectures must include evidence that the Student has attended the Practical Instructions and Examinations of his Teacher in each Course.

13. Of having attended, at a recognised Hospital or Hospitals, the Practice of Surgery, during three Winter* and two Summer† Sessions.

* The Winter Session comprises a period of six months, and, in England, commences on the 1st of October and terminates on the 31st of March.

† The Summer Session comprises a period of three months, and, in England, commences on the 1st of May and terminates on the 31st of July.

14. Of having been individually engaged, at least twice in each week, in the observation and examination of Patients at a recognised Hospital or Hospitals, under the direction of a recognised Teacher, during not less than three months.

Note F.—It is intended that the Candidate should receive the instruction required by Clause 14 at an early period of his attendance at the Hospital.

15. Of having, subsequently to the first Winter Session of attendance on Surgical Hospital Practice, attended at a recognised Hospital or Hospitals, Clinical Lectures on Surgery, during two Winter and two Summer Sessions.

16. Of having been a Dresser at a recognised Hospital, or of having, subsequently to the completion of one year's professional education, taken charge of Patients under the Superintendence of a Surgeon during not less than Six months, at a Hospital, General Dispensary, or Parochial or Union Infirmary recognised for this purpose, or in such other similar manner as, in the opinion of the Council, shall afford sufficient opportunity for the acquirement of Practical Surgery.

17. Of having attended during the whole period of attendance on Surgical Hospital Practice (see Clause 13) demonstrations in Post-Mortem Rooms of a recognised Hospital.

18. Of having attended, at a recognised Hospital or Hospitals, the Practice of Medicine, and Clinical Lectures on Medicine, during one Winter and one Summer Session.

NOTICE.—*Clauses* 6, 8, 11, 14, *and* 17, *and Notes* A, B, C, E, *and* F, *together with the Courses of Lectures on Forensic Medicine and Pathological Anatomy, mentioned in Clause* 9, *are applicable to Candidates who commenced their Professional education on or after the* 1*st of October*, 1870.

N.B.—Blank Forms of the required Certificates may be obtained on application to the Secretary, and all necessary Certificates will be retained at the College.

SECTION III.

I. Certificates will not be received on more than one branch of Science from one and the same Lecturer; but Anatomy and Dissections will be considered as one branch of Science.

II. Certificates will not be recognised from any Hospital in the United Kingdom unless the Surgeons thereto be members of one of the legally constituted Colleges of Surgeons in the United Kingdom; nor from any School of Anatomy and Physiology or Midwifery, unless the Teachers in such School be members of some legally constituted College of Physicians or Surgeons in the United Kingdom; nor from any School of Surgery, unless the Teachers in such School be members of one of the legally constituted Colleges of Surgeons in the United Kingdom.

III. No Metropolitan Hospital will be recognised by this College which contains less than 150, and no Provincial or Colonial Hospital which contains less than 100 Patients.

IV. The recognition of Colonial Hospitals and Schools is governed by the same regulations with respect to number of Patients and to Courses of Lectures, as apply to the recognition of Provincial Hospitals and Schools in England.

V. Certificates of Attendance upon the practice of a recognised Provincial or Colonial Hospital unconnected with, or not in convenient proximity to, a recognised Medical School, will not be received for more than one winter and one summer session of the Hospital Attendance required by the Regulations of this College; and in such cases Clinical Lectures will not be necessary, but a Certificate of having acted as Dresser for a period of at least six months will be required.

VI. Certificates will not be received from Candidates who have studied in London, unless they shall have registered at the College their cards of admission to attendance on Lectures and Hospital Practice within fifteen days from the commencement of the Session; nor from Candidates who have studied in the Provincial Schools in England, unless their names shall be duly returned from their respective Schools.

N.B.—At their first registration in October, Candidates will be required to produce a Certificate of having passed one or other of the Preliminary Examinations in General Knowledge recognised by this College.

VII. Those Candidates who shall have pursued the whole of their studies in Scotland or Ireland will be admitted to examination upon the production of the several Certificates required respectively by the College of Surgeons of Edinburgh, the Faculty of Physicians and Surgeons of Glasgow, and the College of Surgeons in Ireland from Candidates for their Diploma, together with a Certificate of instruction and proficiency in the practice of Vaccination, and satisfactory evidence of having been occupied, subsequently to the date of passing the Preliminary examination, at least four years, or during a period extending over four Winter and four Summer Sessions, in the acquirement of professional knowledge: and in the case of Candidates who shall have pursued the whole of their studies at recognised Foreign or Colonial Universities, upon the production of the several Certificates required for their Degree by the Authorities of such Universities, together with a Certificate of instruction and proficiency in the practice of Vaccination, and satisfactory evidence of having been occupied, subsequently to the date of passing the Preliminary Examination, at least four years, or during a period extending over four Winter and four Summer Sessions, in the acquirement of professional knowledge.

VIII. Members or Licentiates of any legally constituted College of Surgeons in the United Kingdom, and Graduates in Surgery of any University recognised for this purpose by this College, will be admitted to examination, on producing their Diploma, Licence, or Degree, together with proof of being twenty-one years of age, a Certificate of instruction and proficiency in the practice of Vaccination, and satisfactory evidence of having been occupied, subsequently to the date of passing the Preliminary Examination, at least four years, or during a period extending over four Winter and four Summer Sessions, in the acquirement of professional knowledge.

IX. Graduates of Medicine of any legally constituted College or University recognised for this purpose by this College, will be admitted to examination on adducing, together with their Diploma or Degree, proof of being twenty-one years of age, a Certificate of instruction and proficiency in the practice of Vaccination, and satisfactory evidence of having been occupied, subsequently to the date of passing the Preliminary Examination, at least four years, or during a period extending over four Winter and four Summer Sessions, in the acquirement of professional knowledge.

SECTION IV.

Professional Examination.

This Examination is divided into two parts.

1. The First or Primary Examination, on Anatomy and Physiology, is partly written and partly demonstrative on the recently dissected Subject, and on prepared parts of the Human Body.
2. The Second or Pass Examination, on Surgical Anatomy and the Principles and Practice of Surgery and Medicine*, is partly written, partly oral, and partly on the practical use of Surgical Apparatus, and the Practical Examination of Patients.

* Candidates can claim exemption from examination in Medicine under the following conditions, viz. :—

I. The production by the Candidate of a Degree, Diploma, or Licence in Medicine entitling him to register under the Medical Act of 1858, or a Degree, Diploma, or Licence in Medicine of a Colonial or Foreign University approved by the Council of the College.

II. A declaration by the Candidate, prior to his admission to the Final Examination for Membership or Fellowship, that it is his intention to obtain either of the Medical Qualifications mentioned in the foregoing paragraph, in which case the Diploma of the College will not be issued to him until he shall produce either the said Medical Qualification or proof of having passed the several examinations entitling him to receive the same.

3. The Primary Examinations are held in the months of January, April, May, July, and November, and the Pass Examinations generally in the ensuing week respectively.
4. Candidates will not be admitted to the Primary Examination, until after the termination of the Second Winter Session of their attendance at a recognised School or Schools ; nor to the Pass, or Surgical Examination, until after the termination of the fourth year of their professional education.
5. The Fee of Five Guineas, paid prior to the Primary Examination, and allowed on the whole fee of Twenty-two Pounds* payable for the Diploma, is retained ; and after any two consecutive failures at the Primary Examination, the Candidate is required to pay an *additional* fee of Five Guineas prior to being again admitted to that Examination, which *additional* fee is also retained.

* This sum of Twenty-two Pounds is exclusive of the fee of Two Pounds paid for the Preliminary Examination.

6. Five Guineas, part of the sum of Sixteen Pounds Fifteen Shillings, the balance of the whole fee due for the Diploma and paid prior to the Pass Examination, is retained ; and after any two consecutive

failures at the Pass Examination, the Candidate is required to pay an *additional* fee of Five Guineas prior to being again admitted to the said Pass Examination, which *additional* fee is also retained.

7. A Candidate having entered his name for either the Primary or Pass Examination, who shall fail to attend the meeting of the Court for which he shall have received a card, will not be allowed to present himself for examination within the period of three months from the date at which he shall have so failed to attend.
8. A Candidate referred on the Primary Examination is required, prior to his admission to re-examination, to produce a Certificate of the performance of dissections during not less than three months, subsequently to the date of his reference.
9. A Candidate referred on the Pass Examination is required, prior to his admission to re-examination, to produce a Certificate of at least six months' further attendance on the Surgical Practice of a recognized Hospital, together with Lectures on Clinical Surgery, subsequently to the date of his reference.

The following are the Hospitals and Schools of Surgery and Medicine from which Certificates of the Professional Education of Candidates for the Fellowship and Membership will be received by this College, for the year commencing the first of August, 1874.

Hospitals in England.

LONDON. St. Bartholomew's.—St. Thomas's.—Westminster.—Guy's.—St. George's.—London.—Middlesex.—University College.—Charing Cross.—King's College.—St. Mary's.

PROVINCIAL. Bath United Hospital.—Bedford General Infirmary.—Berkshire Royal Hospital, Reading.—Birmingham: General Hospital; Queen's Hospital.—Bradford Infirmary.—Bristol: Infirmary; General Hospital.—Cambridge, Addenbrook's Hospital.—Derbyshire General Infirmary.—Devon and Exeter Hospital.—Gloucester General Infirmary.—Hants County Hospital.—Hull Infirmary.—Kent and Canterbury Hospital.—Leeds General Infirmary.—Leicester Infirmary.—Liverpool: Royal Infirmary; Northern Hospital: Royal Southern Hospital.—Manchester Royal Infirmary.—Newcastle-upon-Tyne Infirmary.—Norfolk and Norwich Hospital.—Northampton General Infirmary.—Nottingham General Hospital.—Oxford, Radcliffe Infirmary.—Salisbury General Infirmary.—Salop Infirmary.—Sheffield General Infirmary.—Staffordshire General Infirmary; North Staffordshire Infirmary.—Sussex County Hospital.—Wolverhampton and Staffordshire General Hospital.—Worcester Infirmary.

Hospitals in Ireland.

DUBLIN. Richmond.—Dr. Steeven's.—City of Dublin.—Mercer's.—Meath.—Jervis Street.—St. Vincent's.—Adelaide.—Mater Misericordiæ.

PROVINCIAL. Belfast General Hospital.—Cork South Infirmary and County Hospital; North Infirmary and City of Cork General Hospital.—Galway County Infirmary and Town Hospital.

Hospitals in Scotland.

EDINBURGH. Royal Infirmary.
PROVINCIAL. Glasgow Royal Infirmary.—Aberdeen Royal Infirmary.

Schools in England.

LONDON. St. Bartholomew's.—St. Thomas's.—Guy's.—St. George's.—London.—Middlesex.—University College.—King's College.—Westminster.—Charing Cross.—St. Mary's.
PROVINCIAL. Birmingham, Queen's College.—Bristol, Old Park Medical School.—Cambridge University School.—Leeds School of Medicine.—Liverpool Infirmary School of Medicine.—Owens College (Manchester) Royal School of Medicine and Surgery.—Newcastle-upon-Tyne College of Medicine.—Sheffield Medical Institution.

Schools in Ireland.

DUBLIN. Royal College of Surgeons.—Trinity College.—Carmichael School of Medicine.—Peter Street Original School of Medicine.—Cecilia Street Medical School.—Dr. Steevens's Hospital.
PROVINCIAL. The Queen's Colleges of Belfast, Cork, and Galway.
The several Schools recognized by the Royal College of Surgeons in Ireland.

Schools in Scotland.

EDINBURGH. University.
PROVINCIAL. Glasgow University.—Aberdeen: King's College, Marischal College and University.
The several Schools recognized by the Royal College of Surgeons of Edinburgh.

Schools and Hospitals in the British Dependencies and Colonies.

The Medical College of Bengal.—The Medical College of Madras.—The Grant Medical College at Bombay.—Canada: The University of Toronto; The University of Trinity College, Toronto; The University of Victoria College, Toronto; The University of McGill College, Montreal; Bishop's College, Montreal; The Royal College of Physicians and Surgeons, Kingston; The University of Laval, Quebec.—Dalhousie College and University, Halifax, Nova Scotia.—Australia: The University of Melbourne; The Melbourne Hospital; University of Sydney; The Sydney Infirmary; Adelaide Hospital.—Tasmania: The General Hospital, Hobart Town; The General Hospital, Launceston.

In Foreign Countries.

Paris.—Montpellier.—Strasburg.—Berlin.—Vienna.—Heidelberg.—Bonn.—Göttingen.—Wurzburg.—Leyden.—Liège.—Pavia.—Pisa.—Royal Caroline Institute, Stockholm.—Copenhagen.—New York.—Philadelphia.—Harvard University, Cambridge, Boston.

The following are the Universities and other Institutions whose Certificates or Degrees will be recognized and received in lieu of the Certificates of having passed the Preliminary Examinations for the Fellowship and Membership respectively at this College, during the year commencing on the first of August, 1874, viz.:—

FELLOWSHIP.

1. A Certificate or Testamur of Graduation in Arts at one or other of the following Universities, viz.: Oxford; Cambridge; Dublin; London; Durham; Queen's University in Ireland; Edinburgh; Glasgow; Aberdeen; St. Andrews; Calcutta; Madras: Bombay; McGill College, Montreal; Queen's College, Kingston, Canada; and a Foreign University on the special recommendation of the Court of Examiners approved by the Council.
2. A Certificate of having passed such Examinations in Arts as shall be required for Graduation in Medicine by the following Universities, viz.: Oxford; Cambridge; London (including Greek and French or German); and Durham.

MEMBERSHIP.

1. A Certificate or Testamur of Graduation in Arts at one or other of the following Universities, viz.: Oxford; Cambridge; Dublin; London; Durham; Queen's University in Ireland: Edinburgh; Glasgow; Aberdeen; St. Andrews; Calcutta; Madras; Bombay; McGill College, Montreal; and Queen's College, Kingston, Canada.
2. A Certificate of having passed one or other of the following Examinations, viz.: Oxford.—Responsions or Moderations; Middle-Class Examinations, Senior, the Certificates to include Latin. Cambridge.—Previous Examination; Middle-Class Examinations, Senior, the Certificates to include Latin. Oxford and Cambridge "Schools Examination Board," the Certificates to include the several subjects required in the Preliminary Examination of the College. Dublin.—Entrance Examination. London.—Matriculation Examination. Durham.—Examination of Students in Arts in their second and first years; Middle-Class Examinations, Senior, the Certificates to include Latin; Registration Examination for Medical Students. Queen's University in Ireland.—Two years' Arts Course for Diploma of Licentiate in Arts; Preliminary Examinations at end of B.A. Course; Middle-Class Examinations, the Certificates to include Latin; Matriculation Examinations. Edinburgh; Aberdeen; Glasgow; and St. Andrews.—Preliminary or Extra Professional Examinations for Graduation in Medicine. Calcutta; Madras; and Bombay.—Matriculation Examinations. Bishop's College, Montreal; McGill College, Montreal.—Matriculation Examination. Queen's College, Kingston, Canada.—Matriculation Examination; Preliminary Examination of Students in Medicine. The University of Trinity College, University College, and Victoria College, Toronto.—Matriculation Examinations. University of Laval, Quebec.—Matriculation Examination. Nova Scotia; King's College, Windsor.—Matriculation Examination, Responsions. Dalhousie College and University, Halifax.—Matriculation Examination. New Brunswick, Fredericton.—Matriculation Examination. University of Melbourne.—Matriculation Examination, with a Certificate that the Student has passed an Examination in Latin. University of Sydney.—Matriculation Examination. New York, Bellevue Hospital Medical College.—Matriculation Examination. Preliminary Examination for the Fellowship of this College. Preliminary Examinations of the

Royal Colleges of Surgeons in Ireland and of Edinburgh, and of the Faculty of Physicians and Surgeons of Glasgow. Examinations in Arts of the Society of Apothecaries of London, and of the Apothecaries' Hall of Ireland. First-Class Examination of the Royal College of Preceptors. Examination for Testamur of the Codrington College, Barbadoes. Examination for Degree of Associate of Arts granted by the Tasmanian Council of Education, with a Certificate that the Student has been examined in Latin and Mathematics. Third-Class Certificate in Literature and Science, Cape of Good Hope.

N.B. *The Certificates of having passed on and after the 1st of January, 1870, the Middle-Class Examinations, Senior, must include Mathematics as well as Latin.*

EDWARD TRIMMER,
Secretary.

Many of those preparing for examination for the dental diploma under the new regulations, will feel the want of general assistance and guidance in their studies; especially will they recognize the impossibility of obtaining the necessary knowledge of anatomy except by demonstration of dissected parts. Many candidates are doubtless unable to spare time for attendance in the dissecting room during the daytime, and we are therefore glad to call the attention of such gentlemen to the announcement of Mr. Oakley Coles, L.M.R.C.S., who undertakes to supply the required instruction in evening classes.

NEW INVENTIONS.

We have received from Mr. Fletcher, of Warrington, one of the neatest little pestle and mortar's that could be possibly desired. It is made of porcelain, and is well suited for mixing either osteo-plastic or amalgam fillings.

S. S. WHITE'S BOW SPRING RUBBER.

We have received from Messrs. Smale, of Great Marlborough Street, specimens of this new rubber. It is, in most respects, similar to the whalebone rubber, but possesses greater elasticity and toughness, and has a denser surface when polished.

A NEW BURRING ENGINE.
(S. S. White's.)

There seems no end to the development of Burring Engines. We have lately examined one only just now brought out by S. S. White, of Philadelphia, and find that for simplicity and perfection of action, it surpasses even the Morrison Engine; in many respects it resembles this

instrument, but the movements are obtained in a much simpler manner, and the machine is therefore less likely to get out of order.

It is apparently protected by a large number of patents of various dates, but whether these will supersede the right of the Johnston Brothers' Morrison Engine, remains to be seen, meanwhile we can strongly recommend S. S. White's Engine to the profession. Mr. Rutterford, of Poland Street, will, we believe, shortly have some on view.

ROYAL COLLEGE OF SURGEONS.

S. J. Hutchinson, of Brook Street, passed the final examination as Member of the College of Surgeons, on July 29th.

LONDON DENTAL HOSPITAL.

CASES TREATED FROM AUGUST 1ST TO 31ST, 1874.

Extractions. Children under 14	343
Adults	500
Under Nitrous Oxide	140
Gold Stoppings	85
White Foil ditto	45
Plastic ditto	99
Irregularities of the Teeth treated surgically and mechanically	29
Miscellaneous Cases	172
Advice Cases	58
Total	1371

DAVID HEPBURN, *House Surgeon.*

LIVERPOOL DENTAL HOSPITAL.

MONTHLY REPORT ENDING AUGUST 13TH, 1874.

Males	250
Females	228
Total	478
Operations, &c.	598

W. J. NEWMAM, *Hon. Secretary.*

From the pressure on our space this month for the Students' Department, we are compelled to hold over a large number of articles of interest.

TO CORRESPONDENTS.

ALL communications intended for the Editor should be addressed to the care of Messrs. SMITH, ELDER & Co., 15, Waterloo Place, Pall Mall.

All inquiries respecting Advertisements and Subscriptions should be sent to Mr. GEORGE BUTCHER, 4, Crane Court, Fleet Street, E.C.

THE MONTHLY REVIEW

OF

DENTAL SURGERY.

No. V. OCTOBER, 1874. Vol. III.

THE LONDON SCHOOL OF DENTAL SURGERY.

The first public Distribution of Prizes at the London School of Dental Surgery took place on the 5th of this month under especially favourable circumstances. Owing to the indefatigable pains taken by the Dean, a large and influential assembly filled the Theatre of the Hospital. More than nine hundred invitations were sent out, and a very large proportion of those who received cards, expressed their interest in the progress of the School by being present. The arrangements made by the Lecturers for the presentation of their Prizes, lent an additional novelty to the meeting, and the address of the Chairman, Mr. Savory, was the crowning success of a day that will be long remembered in the annals of the institution; rarely—if ever—has sounder advice been given in such perfect yet simple language, and even on those points on which we should be disposed to differ, we cannot help recognising the philosophic thoughtfulness and comprehensive judgment of the speaker?

There is assuredly no teaching more valuable than that which induces the student of Dental Surgery to extend his researches into the wider domain of general Surgery and

Pathology, whilst above all things is that tendency to be deprecated that leads to the investigation of the dental organs as isolated structures, instead of as simply parts of a complex body. There is certainly great danger of this tendency gaining such strength as to become a confirmed habit, and it is only by the influence of a professional education that shall embrace the study of the entire animal organism, that we can hope to keep in check the tendency to specialism in study. In no department of Medicine can a liberal education be brought to bear with greater advantage than in the practice of Dental Surgery, for to nearly every science is the Dental Surgeon under obligation in the successful prosecution of his surgical and mechanical labours. At any time in the history of the London School of Dental Surgery, Mr. Savory's address would have been very valuable, but at the present season—and coming as it does from one of the Dental Board of Examiners of the Royal College of Surgeons—it is of infinite advantage, since it is not only an exposition of the requirements of our present students, but an authoritative expression of the regard and interest with which the department of Dental Surgery is looked upon by the rest of our Medical brethren.

The Edwin Saunders' Scholarship.

We congratulate the promoters of the Testimonial to Mr. Edwin Saunders upon the decision that the Memorial of his services to the profession shall take the form of a Scholarship in connection with the London School of Dental Surgery.

The profession will, we are sure, respond heartily to an application for fnnds for such an object, since there is a very wide-spread and sincere appreciation of the work that Mr. Saunders has so successfully accomplished in removing the Dental Hospital from Soho Square to its present position. A marble bust, though useful for decorative purposes, is scarcely the most suitable testimonial to a gentleman who is still in the

flesh, whilst a scholarship is something that not only perpetuates the name connected with it, but also does an amount of good that no statue, however perfect, could accomplish.

Lancing the Gums for Difficult Dentition.

At another part of the *Review* will be found an interesting article by Dr. Finlayson (taken from the *British Medical Journal)* on "The Alleged Dangers of Dentition," and referring especially to the practice of lancing the gums. In connection with this latter subject, we would refer our readers to a paragraph taken from the *Boston Medical and Surgical Journal*, in which a death from hæmorrhage took place three days after lancing the gum of a child fourteen months old.

Royal College of Surgeons.

Up to the time of going to press, thirty-seven students have registered for the Dental Diploma; out of this number sixteen were new students, but there are probably a great many more than this who have not yet entered their names at the College of Surgeons.

There will probably be a Meeting of the Dental Board of the College of Surgeons at the end of this month or the early part of November, those gentlemen who propose presenting themselves for examination under the old regulations of 1859, will therefore do well to send in their forms, properly filled up, at once, that is, if they wish to be admitted at the examination that will be held in January, 1875.

National Dental Hospital.

The Hospital Sunday Fund declined last year to grant any portion of their receipts to the National Dental Hospital, on account of the annual income of the Hospital being so small. In reply to the request of the deputation that waited upon Sir Sidney Waterlow, a promise was made that the case should be reconsidered this year. Upon reconsideration the distribution has in no wise been helpful to the Hospital.

It seems impossible to understand the system upon which the Hospital Sunday Fund Committee base their distribution, but the inconsistencies of this year's work will scarcely increase the popularity of the Collection next year.

We are sorry to find from the last report of the National Dental Hospital that they have still a deficiency in their receipts of over Three Hundred Pounds.

ON THE

MICROSCOPICAL STRUCTURE OF FOSSIL TEETH

FROM THE NORTHUMBERLAND TRUE COAL MEASURES.

By W. J. BARKAS, M.R.C.S.E., L.R.C.P. London.

CHAPTER XI.

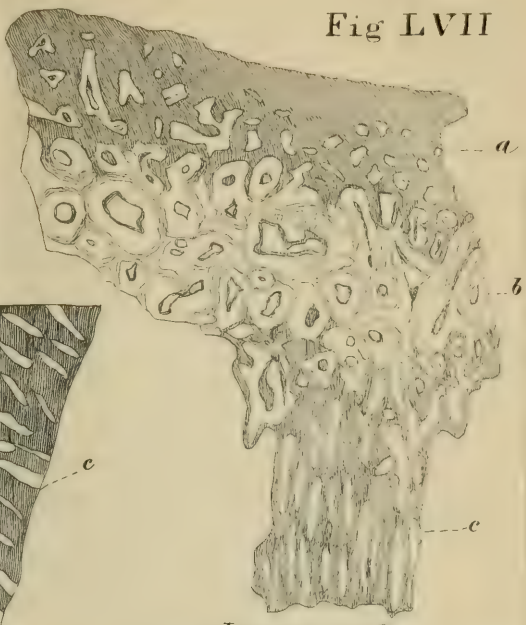
[*Continued from p.* 155.]

JANASSA *(continued).*

In my last paper I described the external characters and the arrangement in the mouth of the teeth of the different Coal Measure species of this genus, and drew attention to their close similarity in these points to some of our existing Rays, and to the species of Janassa that succeeded them in the Permian age. I shall now show that even in microscopical structure the similarity is still clearly to be observed.

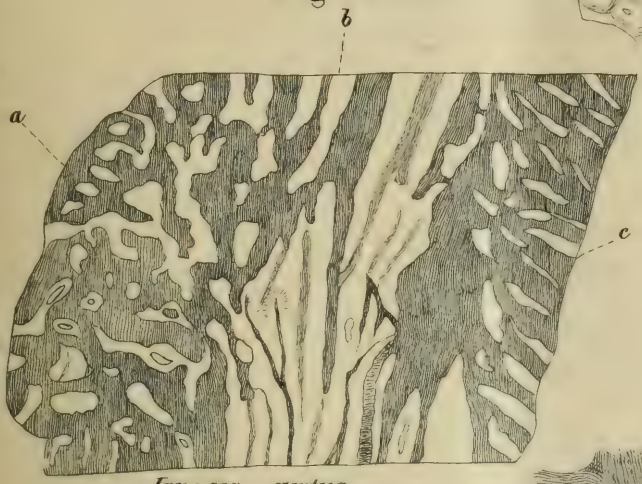
The chief characteristic of the minute structure of Ray teeth is that each vascular system is separated from its neighbours by a distinct boundary, across which no anastomoses take place between the ultimate branches of the calcigerous tubules of one canal with those of the canals adjoining. This structure is found to be peculiar to the teeth of Rays, the only exceptions that I am acquainted with being the rostral teeth of the saw-fish and the teeth of the Orycteropus, a mammal. Professor Owen in his "Odontography," describes and gives excellent engravings of the structure of the teeth of Myliobates, a typical Ray; in these teeth the peculiar characters of the structure are well shewn, and they are pourtrayed by the above distinguished palæontologist thus: "A longitudinal and vertical section of a single dental plate, viewed by a compound lens of an inch focus, exhibits at its base a coarse network of large irregular canals, filled with a vascular medullary pulp. From this network, smaller medullary canals proceed towards the flat grinding surface, in a straight and slightly diverging course, sub-dividing dichotomously, with interspaces equal to their own diameter at the base, but much wider at the working surface of the tooth. In a transverse section of the tooth, under the same power, the area of the medullary canals is seen to present generally an irregular elliptical form, from which radiating calcigerous ubules are faintly perceptible. Each canal and its series

Fig LVII



Janassa ovatus.
Vertical Section through short axis.
Magnified 10 Diam.

Fig LVI



Janassa ovatus
Vertical Section through long axis
Magnified 10 Diam.

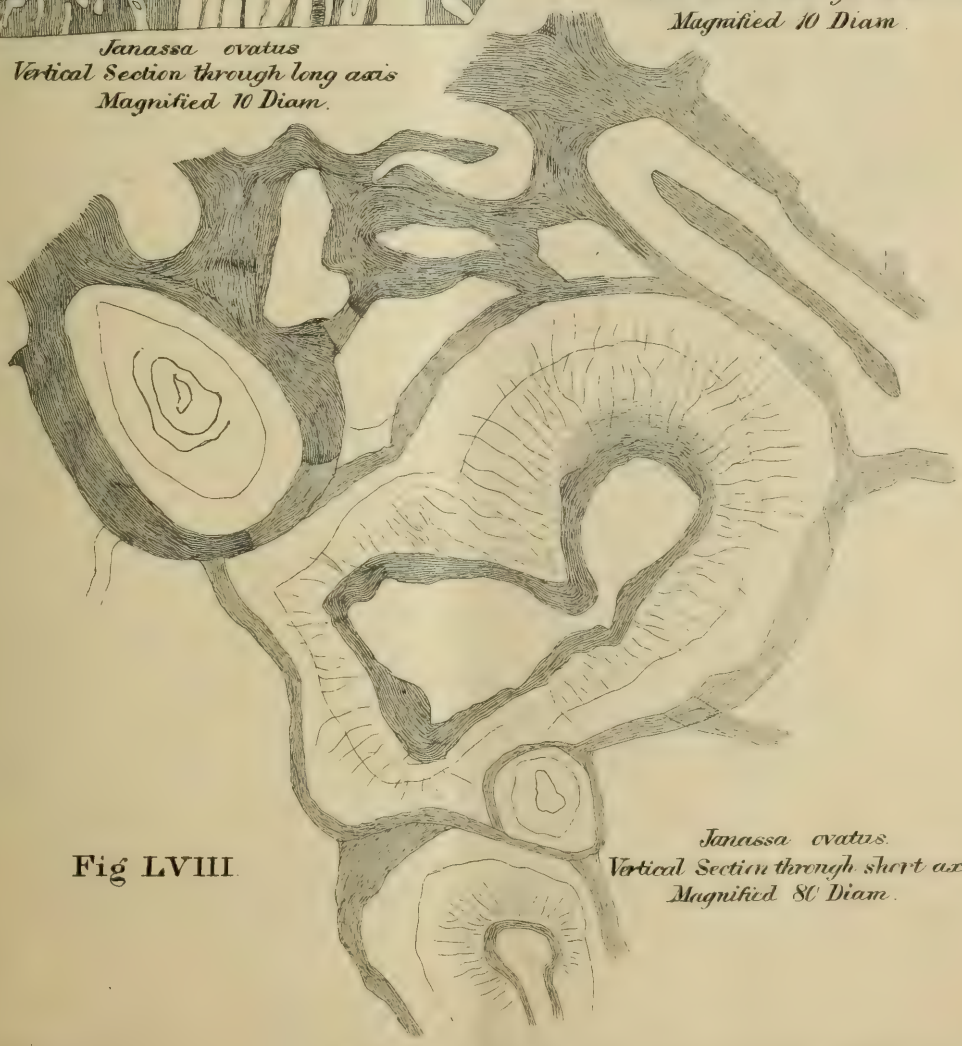


Fig LVIII

Janassa ovatus.
Vertical Section through short axis.
Magnified 80 Diam.

T.Bessent, lith, 29, Essex St., Strand.

of tubes is surrounded by a line of generally a hexagonal form and which constitutes the boundary between contiguous canals and tubes, the whole tooth being thus composed of an aggregate of slender, elongated, commonly six-sided prismatic teeth, placed vertically to the grinding surface. A section through the roots of the tooth shows that these parts are occupied by a network of irregular canals, which anastomose by arched branches with the network of the contiguous root, and these with the network of coarser tubes which occupy the basis of the tooth for an extent exceeding the length of the root itself.

"With a higher power, $\frac{1}{8}$-inch focus, the calcigerous tubules are seen to radiate in all directions from the medullary canals and are sent off throughout the whole course of the canal. These tubes are short, wavy, richly arborescent, and form numerous anastomoses with each other. The transverse sections of the tooth shew that the area of each medullary canal has been filled up or diminished by the deposition of a series of concentric lamellæ in proportion to its term of use."

Janassa ovatus presents a structure very similar to that of Janassa bituminosa (Munster) from the Marl slate of Durham County, in fact the resemblance is so great that it would be difficult to distinguish one from the other by mere examination under the microscope of their minute structure; of course they present a somewhat different appearance when ground into sections, for the reason that Marl slate has quite another composition to Coal shale and all fossils become impregnated with the material in which they lie imbedded. That these structures thus agree, I have been enabled to satisfy myself through the kindness of Mr. T. Atthey (one of the authors of that elaborate paper on "Loxomma Allmani," that appeared in the July number of the *Annals and Magazine of Natural History)*, who lent to me the sections he had prepared for his paper on "Climaxodus," in the *Transactions of the Northumberland and Durham Natural History Society*, in order that I might compare them with my own sections of Climaxodus, or rather I should say Janassa, ovatus. Mr. Dinning, of Newcastle-on-Tyne, also procured me a small fragment of J. bituminosa, presumably from near the root, which I made into a section and I found that in structure it greatly resembled the root of J. ovatus, there being however, a

rather larger proportion of tissue over canals in the former than in the latter. The description therefore that I now give of J. ovatus will almost exactly answer for J. bituminosa, even to the sizes of the calcigerous tubules and medullary canals, and it will be observed that it also agrees in general with Professor Owen's description of the structure of the teeth of Myliobates that I have just quoted.

As each dental plate of J. ovatus consists of a root or base and the tooth proper, I shall describe their structure separately, but it must not be forgotten that the one runs into the other, there being no distinct line of junction.

The base or root is traversed by numerous large vascular canals, somewhat irregular in their diameter; from these canals proceed very large branches which inosculate with the branches from adjoining canals and form a coarse open network; though these branches are large they are smaller in diameter than the main vessels from which they spring, so that the direction pursued by the latter can be plainly distinguished, they run parallel to each other and to the long axis of the root. The canals do not give off any tubules apparently except near the junction of the root with the tooth proper when the tubules become noticeable, but they are even there in comparatively small number. The tissue between the canals is homogeneous. Under a low power, a vertical section of the root resembles the part marked b in Fig. LVI., but under a high power it differs somewhat on account of the deficiency of tubules and the absence of the distinct line of demarcation or boundary between the canals.

In the tooth proper the canals are so arranged that the dental plate appears to be composed of three structures, an inferior, an intermediate, and a superior. The intermediate layer (Figs. LVI. b, LVII. b), is the principal, for it is really the foundation of the superior and inferior layers, in it the canals run parallel to the long axis of the tooth and to each other, they are continuous with the vascular canals of the root but are smaller in diameter; they give off branches, rather smaller than themselves, at an acute angle, these branches after proceeding obliquely towards the anterior edge of the tooth anastomose with an adjoining canal at a point, of course higher than that of its origin, this method of branching gives to the intermediate layer an appearance of being composed of parallel

tubes, and is very well shewn when it is cut across transversely as in Fig. LVII. b; the canals running along the superior and inferior surfaces of this layer give off branches that do not pursue the same course as the main; those from the superior canals proceed obliquely upwards and forwards and terminate upon the grinding surface of the tooth, this is the portion I have designated as the superior layer (Fig. LVI. a, LVII. a), these secondary canals also bifurcate, but only once or twice, and their branches do not as a rule, anastomose with other branches but proceed to the external surface nearly parallel with the main vessel; the inferior canals of the intermediate give off branches that proceed directly downwards to the external surface, rarely if ever branching on their way; this is what I have called the inferior layer (Figs. LVI. c, LVII. c). In all these layers the tissue and the canals are in about equal proportion. Before I proceed any further I think it will be better to explain exactly in what direction the sections I have figured have been made: Fig. LVI. is made from the grinding surface downwards and through the long axis of the tooth; Fig. LVII. is made also from the working surface downwards but through the short axis and of course necessarily cutting transversely those canals that run parallel to the grinding surface; a longitudinal section would of course vary according to the part examined, if it was taken through the intermediate layer it would be all like Fig. LVI. b, but if through the superior or inferior layers it would resemble somewhat Fig. LVII. a and b. From all the canals arise calcigerous tubules which run a short wavy course, branch dichotomously and terminate in rather fine branches, the branches anastomose with each other but some of the terminal branches enter into the boundary about which I shall speak presently (Fig. LVIII.); these tubules at their origin average about one four-thousandth of an inch in diameter, and the larger branches about one ten-thousandth, the finer branches that enter into the line of demarcation measure about one thirty-thousandth of an inch, and can only be observed with distinctness under a power of upwards of two hundred diameters. The boundary that separates one canal with its system of radiating tubules from another, is seen most clearly when the canals are cut across transversely, as in Figs. LVII. b. and LVIII. Each canal it will be observed, is

completely surrounded by the boundary, which is generally irregular in outline, but often is regularly circular or oval; it also has the appearance of being tubular, for in the thicker parts of the section it is filled with dense black carboniferous matter, but as the section becomes thinner this dark substance is ground away, and the tubular character is more clearly evident from the focus of the microscope having to be altered in order that the different parts may be distinctly examined. In Fig. LVIII. the tubular boundary of one system appears to communicate directly with those immediately contiguous to it. The calcigerous tubules that touch the boundary terminate at its walls; whether they communicate with the interior of the boundary I am not in a position to say, but I consider it very probable that they do so. The tissue between the canal and the boundary is laminated somewhat concentrically; the transverse sections also point out that the canals have an irregular though slightly elliptical outline, and that a thin layer of tissue has been deposited with the canal itself, shewing that the fish has lived for some little time.

This tooth certainly presents a very peculiar arrangement of the vascular canals, and I should say, looking at it from a mechanical point of view, that it was not very well adapted for crushing very hard substances, for the greatest power of resistance in a tubular structure is always obtained when the tubules are arranged parallel to each other, and at right angles to the surface, yet here the superior tubules are oblique, the intermediate are parallel, and the inferior are vertical to the crushing surface. Though in this respect the structure of this tooth differs from that of Myliobates, it agrees in more important particulars, or rather it possesses characters that are undoubtedly Ray characters, as will be seen on comparing Professor Owen's description of the typical Ray, Myliobates, with that I have just given of Janassa ovatus.

Before leaving this genus I may state that in the teeth of Janassa bituminosa from the Marl state, the boundaries between the vascular systems also appear to be tubular, but are filled generally with a substance that is distinctly granular, which is certainly not the case in the Coal Measures species as shewn in Fig. LVIII.; but this difference may of course be due to the different formations in which the teeth have been fossilized.

I have not examined the structure of J. minutus nor J. processus, because I only possess one specimen of each, but judging from their generic similarity to J. ovatus, externally I should think that they possessed a similar structure.

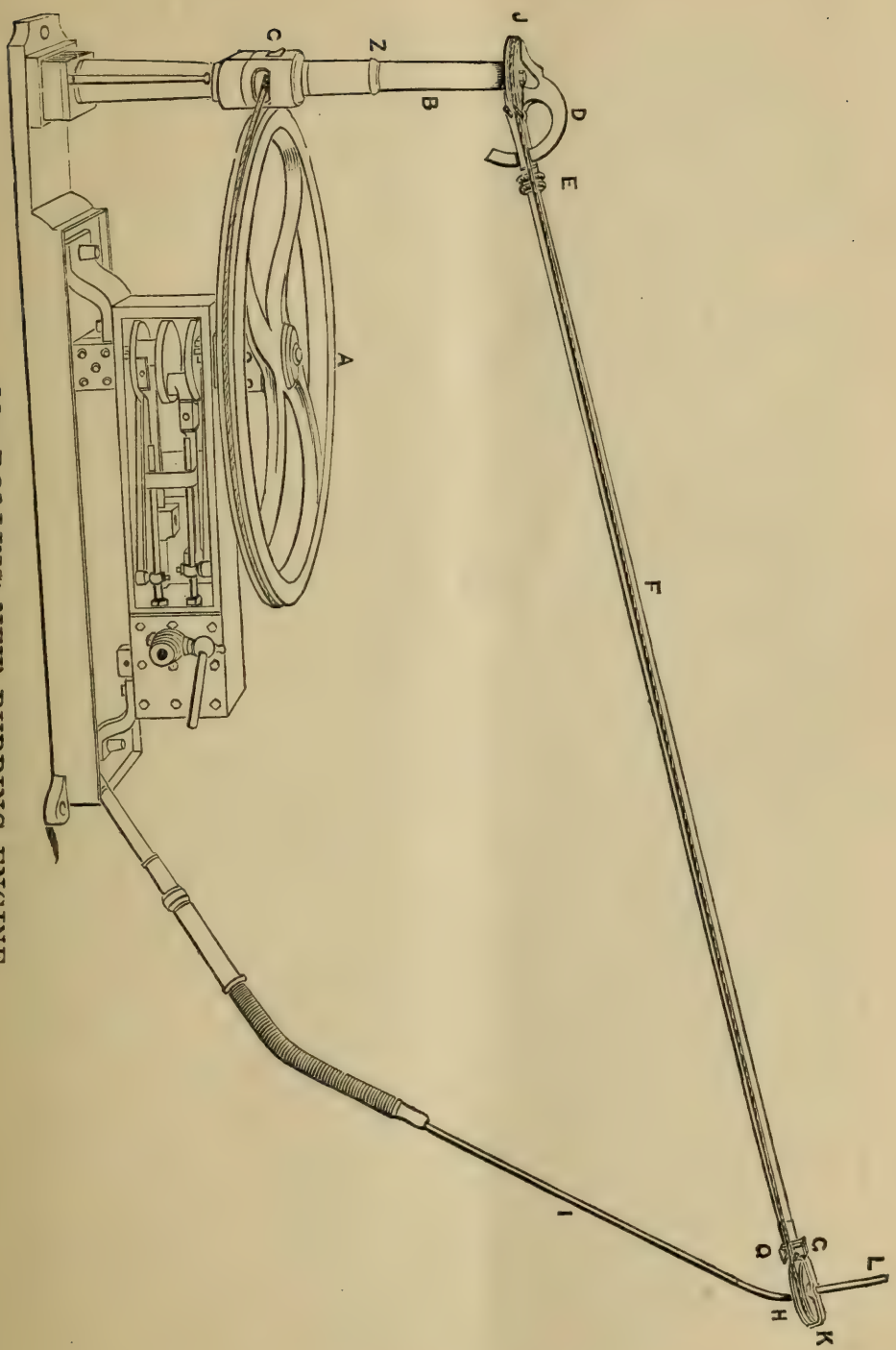
In my next paper I shall commence the order of Ganoids by describing the teeth of Palæoniscus.

A NEW BURRING ENGINE.

Letter from Mr. Wm. H. Rollins, of Boston, Mass., U.S.A.

Sir,—I send you three photographs of an engine which I am using in the operating room. If you think it worth while you are at liberty to publish such portion as you wish. The engine has one merit, that no attempt has been made to patent it, which, in American dental inventions, is rare. Personally, I do not care what is done with it, for my responsibility in the matter ceases with having attempted to have it brought before the profession. Little description is necessary: the motor is a simple double action, two cylinder, horizontal engine, with eccentric movement for valves. The arm F can be raised or lowered, and is clamped in position by means of the milled head E. The head D, to which the arm F is pivoted, is capable of revolving around the standard B. The pulley J, is one extremity of a shaft which is inside the standard, the other end of which is the pulley C. This lower pulley is connected with the driving wheel by a belt. At first, motion was transmitted from A to C by friction of their surfaces, but it was found to make too much noise and use up too much power. Extremity of head piece G, fits into hollow end of arm F. The belt, which passes over J and K, is kept always tight, by a spiral spring in the arm F. Hand piece shaft has a spiral spring one inch long, near head piece G; this allows freedom of movement, and, by its shortness, prevents vibration. Movement up and down is also secured by the head, G turning in the arm F. The hand piece in the photo is the old Morrison style, and is only for temporary use. The stereo view will give an idea of the engine in position. It occupies the upper portion of a case of drawers, in which instruments are kept, and which revolves upon an arm with two joints, that swings

around an upright standard, fastened to the wall, and is raised or lowered by means of a rack and pinion, thus keeping the engine and instruments at the proper height for the operator, whether sitting or standing, and at the same time allowing the engine and instruments to be brought near or pushed away from the patient. All of the engine below Z is out of sight. The valve seen at the right of the chair in the stereo view, is controled by raising or lowering the toes one inch, and owing to the incompressibility of water, the engine stops or starts immediately upon the closing or opening of the valve. With so little noise does it run that patients never know there is an engine in the room. Water seems to be the best motive power for operative dental use, for an engine driven by it can be stopped and started so quickly. Spring power has been tried and failed. With steam and compressed air, owing to the elasticity of the power, the momentum of the fly wheel prevents instantaneous stopping and starting, and makes a brake either upon the driving wheel or hand piece necessary. To be sure a hand piece could be made to "clutch" like the pulleys of an engine lathe; but this would make it necessary to hold always the handpiece in a particular position, in order that the "shipper" might always be under the thumb. Also steam is very uncomfortable in hot weather, even if the boiler is in another room; then, too, there is always condensation in the rubber conducting pipes when they of the length required for the purpose. Compressed air seemed at first to be *the* power for the dentist, because the engine would require so little attention, and there would be no waste steam or water to carry away, but, on the contrary, a rubber tube might be attached to the exhaust and be carried up behind the chair to a level with the operator's face, and there discharge cool air. Accordingly, apparatus for the purpose was constructed; but after having the engine, reservoir, and pumping machinery made, it was found that so small a portion of the power required to compress the air could be obtained from it after condensation, that the idea of compressing by man power was abandoned, and a calculation made to see what it would cost to use the water supply of the city for condensing. The result seemed to prove that it would take about all a dentist would receive in a day to pay for the water, and



MR. ROLLINS' NEW BURRING ENGINE.

with this result in mind, the production of a double steam compressor, to be placed in some part of the house where the heat would not be an objection, and the compressed air to be carried to the operating room, and there run a fan drill, &c., was begun. At this time, however, the idea of the incompressibility of water, and consequent advantage of an engine using this as a power, came to mind, and, as a result, the engine, which is represented in the photograph was made.

ON THE ALLEGED DANGERS OF DENTITION, AND THE PRACTICE OF LANCING THE GUMS.

By JAMES FINLAYSON, M.D.

FELL. FAC. PHYSICIANS AND SURGEONS, GLASGOW.

(BRITISH MEDICAL JOURNAL.)

The question as to the relation which the process of teething bears to infantile disease is of practical as well as of scientific importance. If (as one says) "there is scarcely any affection we do not meet with in one case or other of difficult dentition," it must lie at the very root of the study of the diseases of children. If, as alleged by another, "there never is, and never has been since the world began, any such disease," the other view must stand very much in the way of all true diagnosis. Nor is it merely diagnosis that is involved. Treatment must also vary; and so we find that the operation of lancing the gums is regarded by one as "an all-important remedy," and that he recommends us to "lance the gums *freely and deeply* over the greater part ot their extent *daily*, or *even twice a day;*" while another, "convinced from experience of its futility," has "avoided making it a source of revenue." Such statements represent the two extremes, and nearly all intermediate degrees of opinion may be found to exist among ourselves at the present time. It has appeared to me, from personal observation, that exaggerated and superstitious ideas regarding the potency of dentition as a cause of disease are injurious to the study of this branch of medicine, and no less pernicious in their practical operation in the treatment of children. As, however, such opinions prevail in the profession as well as amongst the public, it was thought that an investigation of the doctrine of teething, at different times and in different countries, might throw

some light on current ideas. I must, however, pass over much of the inquiry on this occasion.

While some writers seem to see in the local process of dentition an event fraught with danger to the general health and the whole economy of the child, others have regarded the irregularities and peculiarities of dentition rather as manifestations of the general condition of the infant, and have looked upon most of the disasters overtaking infants during the teething period as due to faulty management, to bad nutrition, or to some defect in their own constitution or in that of their nurses, when they were not to be regarded in the light of simple coincidences.

The relationship existing between the quality of the milk and the earliness (and presumably the facility) of dentition, was referred to by Aristotle in two separate passages, and it is probable that it was never altogether lost sight of by subsequent writers. The phenomena of dentition, however, are so striking, and the importance of the teeth for the future life of the infant so obvious, that we need not wonder that great weight was attached to the local process. But, important as this process without doubt was, some physicians began to see that it was but one of a multitude of changes occurring simultaneously in the history of the child, and that many morbid phenomena popularly ascribed to teething could with greater propriety be referred to the other systems more directly concerned. Billard refers the attacks of diarrhœa, so common in children during the teething period, to the development of the intestinal follicles and of the other parts of the digestive system occurring at this epoch. He likewise points out that important changes take place in the brain of the child during the first year of its existence; and he maintains that the frequency of cerebral affections at that age ought to be attributed to these changes; this period, however, is the same as that of the appearance of the first few teeth, and, as the changes in the mouth are much more obvious than those in the brain, they have received the credit of producing the convulsive and other cerebral disorders of infancy. Armstrong also seems to have had some doubts about referring the convulsions of children during the period of dentition to this cause, alleging that convulsions occurred before and after the usual periods of cutting the teeth, and that these fits were of the same character as

those which happened during the process. But from what age may symptoms fairly be referred to dentition? The earlier authors seem to have contented themselves with regarding the date at which the teeth usually appear, as the date also of the symptoms referable to this cause; in this view, the seventh month may be named. Soranus suggests that means of mollifying the gums may be commenced about the fifth month, so as to anticipate the dangers of the seventh. But physicians could not forget that symptoms almost precisely the same as those usually attributed to teething were frequently observed before the time for the appearance of the teeth had arrived, and that these symptoms, at whatever age, frequently appeared and subsided without any fresh tooth coming to the surface. To account for such cases, the theory was started that one set of symptoms might be due to the deeper processes of teething—"to the opening of the jaw by the tooth," as Sydenham called it—and another set to the piercing of the gums. This double set of dangers for every one of the twenty milk-teeth affords sufficient scope for the physician to set down any illness he may please during this period as coincident with and dependent on the process of dentition. Accordingly, we find that one writer is convinced of the error of waiting till the sixth month before attributing infantile diseases to teething: another authority begins to suspect teething as the cause of illness after the child has reached his fourth month; a third somewhat arbitrarily assigns the date of birth as the beginning of the troubles of dentition, while Hunter states somewhat vaguely that dentition "is a disease of early age, and, indeed, almost begins with life." It is rather surprising that no writer (so far as I have noticed) has sought to connect distinctly congenital disorders, such as club-foot, with the development of the fœtal teeth. It is evident that to date teething from birth, as Marshall Hall does, is very arbitrary; and the congenital club-foot may surely with as much reason be referred to the irritation of teething as the similar deformity which results from the so-called "dental paralysis" affecting young children.

With an available range of time, extending almost from the beginning of life up to the completion of dentition, it is evident that it must depend very much on the preconceptions of the physician, as to which, if any, of the

numerous ailments of infancy he is entitled to refer to teething. Some, indeed, have sought to substitute for this process other causes nearly equally universal, and they have not found it difficult to refer to them a multitude of diseases usually attributed to dentition. Dr. T. Ballard finds, in the various forms of fruitless sucking, a potent cause of infantile derangement, and it takes the place of dentition so efficiently, that he can make no room for this process in the nosology. Dr. Norton, at the Obstetrical Society, likewise contended that teething ought to be expunged from our list of disorders, and he regarded the evils usually ascribed to dentition as "due to the universal but unphysiological practice of feeding infants on starch food." These two ideas have at least the merit of basing their pathology of infantile disease on some departure from the normal process of nutrition, and if some departure be thus implied, some hope of averting the dangers may confidently be entertained. But there is reason to fear that it is precisely from its fatalistic tendency that the doctrine of teething as a cause of disease is so popular on all hands. If a child die "from its teeth," as is said, it is regarded as having succumbed in the course of a necessary process, for which neither parents nor nurse can be in any way blamed; and, if the doctor have scarified the gums, or ordered whatever is popular at the time, he can join in the self-satisfied lament as if over an inevitable catastrophe.

But, even among those who do not readily wish to acknowledge every illness during the teething period as due to this process, two sets of symptoms deserve special consideration—those which, from their local nature, seem directly related to the teeth, and those which either occur or subside about the time of the appearance of a given tooth. There is a general agreement regarding the possibility of obviously local inflammations being due to dentition; but it is seldom that these can be regarded as so serious as to give rise of themselves to any grave general constitutional disturbance.

With regard to the symptoms of an illness actually concurring with the visible protrusion of the teeth, the possibility of a mere coincidence must be carefully considered. Rilliet and Barthez speak of having seen a difficult dentition concurring so exactly with the development of meningitis, that they were at a loss to know whether the illness

was due to a single or to a double cause. They likewise testify to having seen one or several teeth piercing the gum during the course of meningitis, pneumonia, enteritis, and typhoid fever, without difficulty, and equally without any favourable modification of the course of the illness. This leads us to the consideration of the other phenomenon already referred to, which is, perhaps, even more striking to the popular mind; viz, the more or less sudden subsidence of symptoms about the time of the appearance of a tooth. It must be remembered that, although the distinguished authorities just quoted refer to cases in which teething went on in the midst of grave disease, this is not an usual occurrence; the common event is the cutting of a tooth *after* an illness which may, with great propriety, be regarded as having arrested its progress; and this, of course, may lead to the erroneous notion of the illness having been due to the struggles of the tooth to reach the surface. The cases in which certain symptoms recur with the cutting of every tooth, and without any other obvious cause, constitute by far the strongest argument in favour of their depending on dentition; and, when such an occurrence is well marked and carefully observed, it is not easy to overcome the force of its persuasion. Nor, indeed, is it the object of the present paper to deny that any illness is caused by teething. Its purpose will be served if (as Wichmann says) the reader be kept from attributing too much to dentition, remembering that this is not the only source of infantile disorders during the teething period, and searching carefully for other causes before the illness is referred to a physiological process.

The introduction, or at least the spread, of the practice of lancing the gums may be ascribed to Ambrose Paré. His celebrated case was that of the son of the Duke of Nevers. This child died when eight months old, and the dissection was made and recorded by Bonetus. No cause of death was discovered, except a hardness of the gums, and, on these being laid open, the teeth were found ready to appear. From this it was argued that, if this incision had been made during life, the child might have been saved. Such a remarkable inference received, in the course of time, a still more remarkable confirmation. Called to see a child suffering from teething, and hearing of another whose death had just occurred from the same cause,

M. le Mounier was anxious to observe the state of the teeth and gums in such a case. He made a large incision into the gums, but his pathological inquiries were arrested by the restoration of the child to life! But, notwithstanding the experience and authority which accumulated in its favour, incision of the gum does not seem always to have been followed, either by the appearance of the tooth, or by the cessation of the symptoms to be relieved. The wound in the gum healed up, and a great question was raised as to whether the scar did not hinder the subsequent progress of the tooth. This fear was alleged to be founded on ignorance; for, it was maintained, "all parts which have been the seat of wounds or sores are always more ready to give way to pressure." This reply, however, was met by the assertion that, while new cicatrices were easily torn, old ones were not, and that real trouble had been experienced from this cause. The controvery as to the cicatrix is closely related to another question; viz., at what stage of dentition may the operation be performed with advantage? and how often should it be repeated? While some warn us not to operate too soon, saying that the operation has no room except when the tooth is far advanced and almost visible, others equally warn us against the possibly fatal delay engendered by timidity or inexperience, contending that, if we wait till the gums are considerably elevated and pointed, "the chief danger and pain are then at an end, and nature is sufficient for the purpose." With the practice of early incision, there is naturally associated the justification of repeated lancing. John Hunter was not ashamed to confess that he had "performed the operation above ten times upon the same teeth," and Dr. Churchill tells of a case in which he "was obliged to use the lancet thirty or forty times, each tooth requiring several operations." Underwood recommends, in obstinate convulsions, the lancing of the gums for five or six days in succession. Even this was not enough for Marshall Hall. "The idea of merely dividing the gum to allow the teeth to penetrate it, is inadequate (he said) to the real importance of this all-important remedy. In order to accomplish all that this measure is capable of effecting, we should lance the gums *freely* and *deeply* over a great part of their extent *daily*, or *even twice*

a day, and apply a sponge with warm water, so as to encourage the flow of blood."

The method of cutting the gum was in like manner subject to much variation, alterations, probably, being made when it was found that the results were not so brilliant as expected. Various instruments, including the finger-nail and the edge of a sixpence, were used; but, when the operation was regarded in a serious light, some proper cutting instrument was usually preferred. But, even when a lancet was used, a few fibres might be left undivided; this was held to account for the want of success too often observed, and was alleged as a reason for the increase, instead of the relief of the pain which sometimes followed the operation. Crucial incisions were preferred by some, not only as dividing the gum more completely, but as allowing more easily of the flaps being dissected up and snipped off with scissors. But even this might not suffice; it was alleged by M. Baumes that a piece of the alveolar process might have to be taken away, so as to remove the obstruction, and the offending tooth itself might even have to be extracted.

The very proposal of such violent measures indicates clearly enough that, in the hands of its most devoted admirers, incision of the gums was far from being so satisfactory as was usually represented; the amelioration of the symptoms which resulted was often more apparent than real, and was frequently found to be but temporary.

The tendency of opinion at present seems to assent to Dr. West's dictum, that the circumstances in which the use of the gum-lancet is really indicated are comparatively few. Rilliet and Barthez could only recall one case in which any real benefit resulted from the operation, and the best Trosseau could say of it was, that the practice was useless. Even the most sceptical, however, seem to have encountered occasional cases where convulsions ceased on the lancing of the gums; but such a result is also obtained at times from other most unlikely remedies. It may here be stated that, in his careful study of 102 cases of convulsions in children, Dr. Gee could find no reason to believe that the teeth bore any part in the causation of the fits, and in none of the cases did it seem necessary to lance the gums.

But, it may be said, although the benefit may be very

doubtful, why hesitate to give any child the chance of profiting, in its peril or suffering, by such a simple operation? and it is very probable that this idea regulates the conduct of many in dealing with infantile disorders. Such a proceeding has very properly been stigmatised as "nothing better than a piece of barbarous empiricism, which causes the infant much pain, and is useless or mischievous in a dozen instances for one in which it affords relief." It may, however, be well to consider shortly whether the absence of danger from lancing is so complete as is usually represented. And here we may call in evidence the great modern upholder of the practice, Marshall Hall himself. He was much too consistent an advocate of his own views to ignore the danger of such frequent tampering with the mouth and gums of an excitable infant as he had himself recommended, and he admitted this disturbance as a real and true objection to the use of the gum-lancet. But this objection—no trivial one when fully considered—is not all. Local disasters have also happened. Passing by as doubtful any injurious influence on the ultimate growth of the teeth, suppuration and ulceration of the gums, and even gangrene, are admitted by its advocates to have been seen after this operation. Dangerous or fatal hæmorrhage from lancing the gums, although not likely to be readily recorded, has been published in several cases. Even M. Baumes admits the danger from hæmorrhage in incising the gums when much engorged, and he points out that the swallowing of the blood may conceal the extreme peril of the infant. Hamilton, although he had never seen a death from this cause, heard of one on evidence which he could not controvert. Dr. Churchill admits that bleeding from the wound has sometimes been excessive, requiring pressure, astringents, and caustics. Rilliet and Barthez have known it to require plugging. Dr. B. W. Richardson speaks of having "had two or three very painful lessons of this description," and he mentions one death occurring to a country practitioner, and another accident with nearly fatal syncope in his own dispensary practice. Dr. Young (Edinburgh), narrated a few years ago, two deaths from this cause, which occurred in his father's practice. Fatal hæmorrhages have also been reported by Taynton, Anderson, Whitworth, Des Forges,

and Nicol, and in only one of these cases was there supposed to be any special hæmorrhagic tendency.

Further scrutiny of these cases shows, as we might expect, that nearly all these deaths were reported under somewhat exceptional circumstances; so that many more disasters have, doubtless, occurred and have been allowed to slip into oblivion. Without laying undue stress on these perils and calamities, occurring as they do amongst an enormous number of operations, they may well be seriously considered *when the generalisation of the treatment is contended for on the ground of its absolutely innocuous character.*

The chief danger, however, of the wholesale use of the gum-lancet lies in its embodying in practice a theoretical view of the ailment, and so tending to close the mind against further inquiry into the diagnosis, etiology, and treatment of infantile disorders.

London Dental Hospital.

The entry of students at this Hospital has been unusually large this year, so much so, that the plugging room is almost inconveniently crowded, and certainly ill-ventilated; this may, however, be due rather to bad management than to any structural defect, we hope it is, so that better management may give the room a purer atmosphere. But with nearly seventy students—twenty-three of whom have entered this Session—increased accommodation will soon be necessary.

DEATH FROM LANCING OF THE GUM.

In the *American Medical Journal*, for April, are given the particulars of the death of a child fourteen months old, from hæmorrhage occasioned by the lancing of the gum over a molar tooth. The blood oozed from the divided gum for three days, in spite of all efforts to suppress it. The child was well developed, and healthy from birth, and no previous suspicions had been entertained of the existence of a hæmorrhagic diathesis.—*Boston Med. and Surg. Journal.*

Perforated Palate.

A modification of an old operation for perforated palate (congenital) has been devised by Mr. Thomas Cooke, of the Westminster Hospital. In the case of a patient under his care at the Hospital, Mr. Cooke, instead of paring the margin of the cavity, split up each lateral border, so that the two raw surfaces of each flap could be brought into contact, thus increasing the healing surface, and avoiding any waste of living tissue in the event of the union first obtained, breaking down.

THE SURGERY OF THE MOUTH,

By FRANCIS MASON, F.R.C.S.,

SENIOR ASSISTANT-SURGEON AND LECTURER ON ANATOMY AT ST. THOMAS'S HOSPITAL.

(*Continued from vol.* 3, *page* 174.)

DISEASES OF THE BONES OF THE FACE.

I. PERIOSTITIS, DENTAL AND ALVEOLAR.

The bones of the face, like those of every other part of the human body, are covered by periosteum of varying density, which is subject to changes and diseases either commencing in itself, or originating in the bone and invading the membrane secondarily. Of the periosteum in this locality, that which invests the lower jaw is perhaps the thickest, although the fibrous covering is fairly dense on portions of the superior maxillæ, the palate malar and nasal bones; in the more delicate bones, as the lachrymal, inferior turbinated and vomer, it is comparatively slender. Inasmuch as the periosteum lines the alveolar cavities, covers the fangs of the teeth, and becomes continuous with the fibrous structure of the gums, it is especially in this situation that the surgeon has the opportunity of observing morbid changes in that membrane.

Periostitis, or inflammation of the periosteum in the region of the face, is, in most respects, pathologically similar to the affection in other parts of the body. The principal forms about to be described, are the dental and alveolar periostitis, which may be met with in the acute, sub-acute, chronic, and diffuse varieties. As the periosteum covers the bone so closely, the latter must participate, more or less, in any inflammation of the investing membrane. The exception to this, however, seems to be syphilitic periostitis, in which the fibrous structure is the part chiefly if not solely, involved. Periostitis usually attacks superficial bones, and the upper and lower jaws are most generally selected as the victims. In other parts of the body, too, the same rule obtains, thus the front of the tibia, the ulna, and clavicle, from their superficial situations, are frequently attacked with periostitis, their position rendering them more susceptible to the influence of cold and injury, hence it is as Mr. Stanley observes, that "periosteum on the *posterior surface* of the tibia is rare."

Periostitis is attended commonly with a good deal of pain,

although there need not, necessarily, be much swelling. It may have its origin in some peculiar morbid condition of the system, arising from scrofula, rheumatism, syphilis, or the incautious use of mercury. It is also known to follow injuries, such as a blow, gunshot wound, or a fracture, when the term "traumatic periostitis," is applied to it. Again it may appear in patients otherwise apparently healthy, the inflammatory action being set up by simple exposure to the vicissitudes of the weather, or there may be a combination of causes, as the patient taking cold when under a course of mercury, or during convalescence after fever. Again the inhalation of the fumes of phosphorus will occasion it. I shall, in subsequent pages, allude to what is known as "match makers' disease," or "phosphorus necrosis" of the jaws, but it may not be out of place if I briefly refer to an opinion expressed by Herr Von Langenbeck on the subject. He remarks "that the teeth are mostly normal, a fact opposed to the general opinion that the disease (phosphorus necrosis) commences in carious teeth. He objects to the term necrosis, the condition is, he says, one of *periostitis*, and bony deposit takes place to a greater or less extent, sometimes enclosing the jaw as in a sheath; there is no exfoliation*."

There is yet one more cause of acute periostitis which I have never yet seen noticed in books; it is a variety that I have a few times met with in the drivers of manure carts, or in others who are perpetually exposed to the concentrated exhalations of the stables. The explanation in these cases seems to be that the fumes from the saturated straw affect the teeth or periosteum in some way. The disease, in the cases I have seen, could be accounted for in no other way.

In *acute periostitis* the membrane at first shows but little evidence of inflammation, but soon it becomes extremely vascular, swollen, and succulent, Lymph is poured out in abundance, and in some cases separates the periosteum from the bone. As the bone derives a great portion of its nutrition from this membrane, it follows that if the blood supply be diminished, there is a risk of the bone undergoing necrosis; as we shall see, timely treatment will, in many instances, avert this untoward result. The affection

* Berliner Klin. Wochenschr, Jan. 8, 1872.

is frequently associated with decayed teeth, although it should be borne in mind that the same train of symptoms are observed when the teeth are, apparently, perfectly sound. The periosteum lining the alveolar cavity swells, so that a sensation of fulness of the part is noticed. On closing the jaws, the patient finds, for a day or two, that pressure on the tooth which is slightly raised above the level of its neighbours, rather gives relief than otherwise, probably by expressing some of the inflammatory products which may, in almost all cases, be seen to exude at the margin of the gum. In most instances of this kind, there is more or less inflammatory congestion, which passes off in a few days—undergoes resolution—when the parts resume their normal condition for a time. Sub-acute inflammation of this kind will sometimes follow the process of "pivoting" teeth, and occasionally the most acute inflammation is set up by this simple procedure. Not long ago I saw a lady who had undergone the operation of "pivoting." She suffered intensely for ten days, when a large abscess burst outside by the side of the nose; this continued to discharge, and three weeks after I removed a small piece of exfoliated bone. As the inflammation increases, the least touch, or the contact of the opposing teeth, produces intense agony, rendering mastication on the affected side impossible. There is often considerable swelling or œdema of the cheek, which is usually here, as in other parts of the body, an almost certain sign of deep-seated inflammation, if not of suppuration. The neighbouring gum is hot, and exquisitely painful to the touch, and occasionally, but rarely in comparison with the suffering the patient endures, there is some constitutional inflammatory fever; the patient sleeps badly, the symptoms being aggravated at night. The explanation of this nocturnal exacerbation seems to be that pain is greater during the period of repair, than it is during waste, or the breaking down of tissue.

With regard to *treatment* of acute periostitis, if we take as an illustration the simple dental or alveolar periostitis, should there be small a quantity of pus at the fang of the tooth or in the alveolar cavity, instant relief will be afforded by extracting the offending tooth, and this may be done at once, without waiting for the subsidence of the acute symptoms. Many patients, however, are content to submit to a

periodical and temporary inconvenience in order to save a valuable molar. Ordinarily there is pain during mastication for a few days, when a small quantity of pus collects, generally on the outside of the gum, and this discharging, the patient is relieved. Occasionally a persistent small fistulous opening is observed, and the granulations either form a kind of projecting papilla, or have a flattened appearance due to pressure of the cheek. They vary in length, but I have seen them $\frac{3}{4}$ of an inch in length. Sometimes the lymphatic glands in the neck enlarge by sympathy.

If the inflammation be very acute, the main point is for the surgeon to endeavour to cut short the disease. I have already spoken of the intense pain that is always present; this is due to the unyielding and tough nature of the periosteum. Like all fibrous membranes, it resists ulceration for a long time, and hence there is little tendency for the subjacent pus "to point," or come to the surface. It rather spreads laterally, stripping the investing membrane in all directions, and placing the bone in great jeopardy of necrosis. The surgeon should therefore make a free incision inside the mouth and near the affected tooth; the object of this is twofold, first, to prevent the stripping of the bone, and second, to avoid, if possible, the pointing of the abscess outside the cheek, which is frequently followed by an ugly scar, or by a still more ugly adhesion*.

There is one practical point to which I may here refer, and it is that in all abscesses on or near the jaws, the surgeon should not fail to make a thorough examination of the teeth; this examination seems the more required when we know that cases are recorded in which sinuses have been found at a considerable distance from the jaws even, so low down as the clavicle, and yet connected with diseased teeth†. The following interesting case, reported by Mr. Parker, bears closely on this subject, and is worth noting. "The patient was 23 years of age, and, in 1850, the crown of the right lower molar was broken off in attempting to remove the tooth, the fangs being left in the socket. After a period of seven years, during which no less than thirteen

* See *Monthly Review of Dental Surgery*, art. "Surgery of the Mouth," vol. i., p. 411.

† "Tomes' Dental Surgery."

abscesses formed in various parts of the neck, Mr. Parker removed the stumps with immediate recovery." *

Chronic periostitis is characterized by less severe symptoms. In this there is a greater tendency to thickening, owing to the effusion of plastic lymph, which often undergoes a process of organization. Under these circumstances the lower jaw will remain swelled and hard for an indefinite period, in some cases never completely regaining its *contour*. This condition may be accounted for by the deposit of small spiculæ of bone, the pathology of which Mr. Goodsir so well explained. He asserted that "the periosteum, when raised by the exudation, drags out or extends the processes which stretch from its internal surface into the superficial Haversian canals, and as the texture which occupies the canals is the formative organ of bone, these retracted processes are the centres from which new deposits of bone proceed."†

The pain in chronic periostitis is nothing in comparison with that experienced in the acute form of the disease; it is more of a dull aching character. In this state "nodes" will probably be found in other parts of the body, especially on the tibia, ulna, and clavicle, and Mr. Heath states that "the palate is especially liable to these swellings, which are due to effusion between the periosteum and bone, and which, if left untreated, will as surely lead to necrosis as the more acute forms."‡

Chronic periostitis is frequently associated with a form of neuralgia of the periosteum, which is very annoying to the patient, and little less wearing than the more severe varieties, in which the larger nerves of the face are chiefly involved.

The *treatment* requires less severe measures; the general health should be improved, broken stumps should be removed, and in some cases benefit may be derived from the application of blisters, the tincture of iodine, or the iodine ointment. If there be evidence of strumous disease, cod-liver oil and ferruginous tonics may be administered. The sheet anchor in these cases however, is the iodide of potassium, given in five or ten grain doses, three times a day, which is almost invariably followed by marked improvement.

* *Lancet*, March 6, 1858, p. 238.
† *Monthly Journal*, Feb., 1850, p. 103.
‡ "Diseases of Jaws," p. 102.

If this treatment be persistently employed, a permanent cure may be reasonably expected. The iodide of potassium is supposed to be a specific in cases of syphilis, and because it cures the patient, the case is by some surgeons pronounced as undoubtedly having its origin in that disease. This may be so, but I could point to numberless examples in which a cure has been effected, and yet there has not been a particle of syphilitic history. I shall have occasion to refer to this subject in future pages, but I venture to submit that syphilis is a disease "more sinned against than sinning." At all events in the present day there is much reason to believe that it is made responsible, most unwarrantably, for almost all the ills that flesh is heir to.

Diffuse periostitis will be more particularly alluded to in connexion with necrosis.

CRITICAL ABSTRACTS.

DR. OGSTON ON CONGENITAL MALFORMATIONS OF THE LOWER JAW.

(GLASGOW MEDICAL JOURNAL, JULY, 1874.)

CASES of congenital malformation of the lower jaw are very rare (as compared with those occurring in the upper jaw), and but very few have been placed accurately on record.

Dr. Ogston has collected information from various sources (chiefly foreign), and in his article treats (1) of non-development of the inferior maxilla.

This has never been recorded in man, except in association with deficient cranial development. It has, however, been noticed in the lower animals, and six cases are quoted from Vrolik, three occurring in lambs, two associated with cyclopia, and one with deficiency of the face, and two others in sows, and one in a rabbit, these last three were all the subjects of cyclopia.

(2) Excessive development of the lower jaw has been recorded by Otto, and three of his cases are given by the author.

1. In a human hemicephalic monster of the seventh month of pregnancy; spina bifida, cleft palate, and abscess of the arch of the calvarium, were also observed in this instance; the cervical vertebræ were deficient in number,

only four existed, the upper five dorsal vertebræ were cleft behind, and partly fused together, whilst the three upper ribs on the right side were absent.

Otto's second case was similar to the one just mentioned, except that there was no spina bifida, and the third is too briefly noted to be of any value.

Vrolik is reported by the author as giving drawings and descriptions of the skulls of two infants, born with cyclopia, where the upper maxillary bones were small, and the lower jaw correspondingly prominent. Some of the bones of the face were wanting in the second of these two cases, namely, the vomer, nasal, and turbinated bones, whilst the orbital part of the frontal bone was absent, and replaced by membrane. The two superior maxillary bones were imperfectly developed, and fused into one.

A third case of Vrolik's is of more interest. Here the nasal bones are rudimentary, the upper maxillary bones small, and the alveolar processes contained apparently one molar less than usual. Judging from the drawing illustrating this case, the development of the lower jaw is excessive.

[More careful consideration, however, shows that this is rather apparent than real, since we find the mental foramen occupying a position but little posterior to its normal one, and the space on either side in the alveolus only sufficient for the full complement of teeth. The case seems scarcely to be fairly described under the head of excessive development, but should rather be considered one of abnormal growth, as so far as a reliable conclusion can be come to, from the evidence of a somewhat imperfectly executed drawing, the increased obtusity of the angle of the lower jaw, and the arrested development of the upper jaw, would sufficiently explain that which at first might be regarded as a case of excessive development of the lower jaw] (Rep).

3. Congenital smallness of the lower jaw. (*a.*) Of both halves. Otto mentions this as occurring in animals, and Otto gives three cases of it in the human subject, one in a seven month fœtus, and two in newly-born infants. One infant had supernumery fingers and toes, and the other incurved upper extremities, and Vrolik has published a case of Von Ammon's where congenital smallness of the lower jaw and mouth coincided. The child had also cleft palate, "to an extent remediable by staphyloraphy." All

the sisters of the infant had imperfectly developed lower jaws.

A case that came under Dr. Ogston's own observation is given, in which congenital smallness of the lower jaw occurred to such a marked degree that it was plainly observable within a short time of birth.

In four days the child died from starvation. Dr. Ogston, at the request of the medical attendant, and in his presence and that of the surgeon called in for consultation before death, made a post mortem examination, and then discovered that the hard and soft palate were entirely absent, the vomer ending inferiorly in a rounded margin, continuous in front with the alveolar process of the upper jaw. A careful examination of the lower jaw showed the dentul arrangement normal, and the bone symmetrical, and well proportioned, but smaller in size than a well-developed jaw; the measurements being compared with those given by Hüter (Virchows Archive, Bd. XXIX, p. 21).

Having thus given cases in which the lower jaw was disproportionately small in comparison with the upper jaw, Dr. Ogston goes on to treat of those deformities of the inferior maxilla that have been recorded, in which "alteration in the outline, or proportions of the different parts of the bone," took place.

These are very rare, but Vrolik has described and figured the skull of an adult male from his own museum, in which the lower jaw is too short, and at the same time removed too far backward, so that when the teeth are antagonized, the jaw being drawn backwards as far as possible, the inferior iucisors reach only to the upper canines.

This, however, is partly due to the excessive protrusion of the upper incisors and canines, both upper and lower jaws being deficient of third molars, the alveolar processes being contracted, and the palate short. The angles of the lower jaw terminated on each side in a point continuous with the perpendicular posterior margin, and which was bent outwards, and separated by a semicircular notch from the inferior margin. This malformation of the upper and lower jaws was associated with a sinking downwards of the occiput and elevation of the central portion of the base of the skull, the zygomatic arch having its middle portion moved upwards.

After carefully entering into the details of the case,

Vrolik comes to the conclusion that "the peculiarities of this skull are dependant on each other, and have one common cause, viz., the congenital shortness of the lower jaw."

From this view Dr. Ogston, in part, dissents, believing the want of symmetry of the cranium "to have been coetaneous with the deformity of the jaw, rather than to have been produced by it."

[It should be noted that the plates illustrating Vrolik's case are manifestly inaccurate, since in two views of the lower jaw, taken from the same point of observation, we have, in one instance (plate II, fig. 4), the mental foramen under the first molar tooth; and in the other (plate III, fig 6), it is represented under the second bicuspid, and nearly approaching a position midway between the fangs of the second and first bicurpids. This inaccuracy is the more unfortunate from the fact that the mental foramen is of so much value as a point from whence measurements may be taken.] (Rep.)

A case of Langenbeck's is also given, but from the absence of illustrations it loses somewhat of its interest. Here the angle of the lower jaw was considerably more obtuse than is usual in the adult, the coronoid processes were directed in an unusual direction, so that when an attempt was made to open the mouth, they became jammed against the zygoma.

Langenbeck removed the coronoid processes, so that the patient might take food with less difficulty. Dr. Ogston concludes that congenital smallness does exist, but only rarely; where present is usually conjoined with symmetrical deformities elsewhere, such as cleft palate. In some cases there is deficiency of the teeth, in others not; and he further believes that the absence of some of the teeth is more probably a consequence of the cause which has produced the smallness of the jaw, than itself capable of explaining the origin of the smallness.

OAKLEY COLES.

P. Magitot et Ch. Legros, Origin et formation du follicule dentaire chez les Mammifères. Compt Rend, 1873, ILXXVI., 1,000—1,003. The same, De la chronologie

du follicule dentaire chez les Mammifères. Ebenda 1873, IILXXVII., 1377—1380.

The same, Greffes de follicules dentaires et de leurs organes Constitutifs isolément. Ebenda 1874, ILXXVIII., 357—360.

In the first communication, the authors describe the histogenical occurrences during the development of the teeth, envelopment of the enamel germ in the buccal epethelium, and formation of the dentine germ, somewhat in the digressive manner of the earlier description of Waldeyer. Whilst the temporary teeth are developed separately in the manner described, the permanent teeth show a deviation from this type of development. The development of a permanent tooth differs according as to whether a temporary tooth has preceded it or not. In the first case, in the epethelial part of every temporary tooth, a kind of secondary process occurs, which pushes itself through the jaw till it has forced itself below the temporary tooth, and there carried on the same developing processes which lead to the formation of a temporary tooth. It is quite otherwise when the permanent tooth has not been preceded by a temporary tooth, as, for example, in the three posterior molars in the human subject. The first of these molars is formed from an especial fold of the buccal epethelium, and does not originate from an epethelial germ of its neighbouring tooth follicle, whilst the second molar does not spring direct from the buccal epethelium, but from an epethelial germ of the follicle of the first molar, and the third arises in like manner from the second.

The second communication contains important details on the chronology of the development of the teeth in man and in the mammalia. The earliest was the human embryo (3-cm. 7 weeks), when the presence of the primitive epethelial opercula was established: superficial extension of epethelial opercula. At 5½-cm. length: level extension of the epethial covering. At 7½-cm, enamel organ. At 11-cm, dentine germ. At 28-cm, complete formation of the follicle wall. At 20-cm, the epethelial germ of the second dentition is already separating from the position occupied by the foundation of the first. The further phases of the development of the second teeth can be studied in an embryo of 27-40-cm. At 20-cm the first opercula for the foremost of the three molars is formed, the secondary pa[illegible]læ for the second molar in the third month of life, the

tertiary papillæ for the third molar (wisdom tooth) in the third year.

To elucidate these conditions the authors have divided them into a very instructive table. Further details on the chronology of the development of the teeth in the mammalia (sheep, horses,) can be read in the original.

In the third communication, the attempts at transplantation of formative matter are recorded. The authors took the fresh material from dead or new-born dogs, and placed it immediately under the skin of other animals. Ten attempts to transplant the formative matter of new-born dogs in guinea pigs entirely failed. In opposition to this, in seventy-eight attempts, in which the formative matter of new-born dogs was transplanted to full-grown dogs, a portion, at least, had a favourable result.

In five attempts, pieces of the jaw with the enclosed tooth germs were inserted under the skin. Result: two suppurated, two were resorbed.

Nineteen attempts in which the isolated enamel organ was inserted under the skin, ended with resorbtion.

In twenty-six complete follicles which were transplanted seven were further developed, and indeed normally in six cases, whilst one case of impaired nutrition led to the formation of a globular tooth substance and irregular order of the enamel prisms.

In sixteen transplanted isolated dentine germs three were further developed. In two cases an entirely new and regular dentine capsule was formed, in the third it was irregular. Enamel was not formed in any case. Seven dentine germs transplanted with their capsules of tooth substance were entirely resorbed.

From their experiments the authors draw the following conclusions: (1) The formative matter of teeth can only be transplanted to animals of the same zoological order. (2) Jaw substance, with enclosed follicles, fails on account of suppuration or resorbtion. (3) Isolated enamel organs are resorbed without exception. (4) Entire follicles and isolated dentine germs may live and become further developed. (5) Under certain conditions the development proceeds quite regularly, only considerably slower. (6) Under other circumstances disturbances in the normal development of dentine and enamel occur.

(Centralblatt fûr die medicinischen Wissenschaften, August, 1874.)

ODONTOMES.

(Traité des Tumeurs. Par Paul Broca).

ODONTOMES GENERALLY.

(*Continued from page* 169.)

THE PRINCIPAL VARIETIES OF ODONTOMES.

In the paragraph which I devoted to the classification of odontomes, I indicated in a brief manner the most essential characteristics of each of the varieties which I admitted. This allowed me to proceed to a general study, and thus avoid continual repetitions, but the reader, up to the present time, can have but an incomplete idea of the groups I have established, and the moment has now come for me to give a more ample description.

I ought, perhaps, from the novelty of the subject, to publish in detail the observations upon which I rely, but it is necessary, on account of their novelty, to discuss at length the interpretation of each fact, and this brings me to the limits allowed in the plan of this work. I regret not to be able to join to my descriptions all the justifying points which would be necessary to demonstrate their exactness. Those of my readers who desire proofs, will find them in an especial work *On odontomes*, the editing of which is finished, and the publication of which is to follow shortly after this volume.

I shall now pass in review the principal varieties of odontomes, following the order indicated in the table above.

I. EMBRYOPLASTIC ODONTOMES.

These tumours are described by Dupuytren under the title *fibrous bodies*, or *fibrocellules of the jaw*, which he compares to the fibrous bodies of the uterus. They present, according to their density, colour, and vascularity, considerable variations, but the microscope shows definitely that their tissue is always constituted by the arrangement, or by the evolution of the embryoplastic elements of the dental bulb. Some—and these are in general the softest and the most vascular—are principally, or even exclusively formed of fibro-plastic nuclei, of spindle shaped bodies, and of a small quantity of fibro-plastic fibres. Others enclose, as well, a large proportion of fibres of connnective or fibrous tissue. Others, again, are entirely, or almost entirely,

fibrous. These last are very hard, whitish or greyish, and it is with difficulty that very fine vessels are seen here and there. These characteristics, and these transitions are precisely those which may be observed in the series of fibroma and fibroids, and which are described at the end of this work. It is of consequence, at all times, to distinguish the embryo-plastic odontomes from the other fibrous or fibro-plastic accidental productions, seeing that they are not spontaneous; they are of the nature of hypertrophies, and not of the nature of pseudoplasms. They have the same elementary structure as the fibroma and fibroids, because at the epoch of their first appearance the dental bulbs possess, in fact, the structure of fibroids and the strength of fibroma, but they are the result of a disturbance of nutrition much less grave than that which gives rise to an abnormal tissue in an abnormal place, and clinical observation agreeing at each point with pathological physiology, show us that they never behave in the same way as tumours more or less malignant.

Embryo-plastic odontomes may be brought under two principal sub-varieties, which we shall designate under the name *fibro-plastic odontomes* and *fibrous odontomes.* This division corresponds pretty well with those admitted by Dupuytren. He calls our fibrous odontomes, *fibrous bodies of jaws*, and our fibro-plastic odontomes *fibro-cellular bodies.* It is probable that all these tumours, at the time of their first appearance, are exclusively fibro-plastic like the tissue of the bulb itself. We must not forget that in normal development one portion of the elements of the bulb pass into a state of connective or fibrous tissue. According as to whether the work of hypergenesis is more or less precocious, more or less active, and that it modifies more or less the properties of the bulbous tissue, the fibro-plastic elements in excess, may lose, preserve, or exaggerate their natural tendency to fibrous evolution; thus may be explained the variations in structure of the embryo-plastic odontomes.

We have said, in speaking of odontomes in general, that these tumours are encysted in a fibrous sack, which they entirely fill and to which they adhere by a larger or smaller base. This rule has some exceptions; fibrous tumours may in time contract in their entire length the solid adherences with the wall of the cyst, and finish even by becoming

entirely fused with it. The tumours which present these characteristics, are, in general, old and voluminous, but are extremely similar to odontomes clearly encysted, whose follicular origin is evident. On the other side the fibro-plastic odontomes are only able to fill incompletely the fibrous sack, the free part of the surface being separated by a layer of liquid, this is sometimes a limpid or sanguinous serum, sometimes of almost pure blood, sometimes a sort of mucous, with or without crystals of cholesterine, sometimes of a thickish yellowish substance containing epethelial cells and fatty matter somewhat analogous to that which fills certain sebaceous cysts. When, in such a case, an incision is made in the wall of the cyst, the contents of the pouch run out, and the odontome may be at once perceived, constituting a solid rounded mass with a large base, soft and pliable, which can be detached without difficulty with the knife or even with the fingers.

A tumour is not necessarily an odontome, except when it is fibrous or fibro-plastic, and when it occupies the alveolar region of the jaws. The maxillary bones can, like all other bones which contain spongy tissue, become the seat of fibrous or fibro-plastic productions, strangers to the organs of dentition; but these differ from our odontomes by many characteristics. They may occur at any age, whilst the embryo-plastic odontomes can only be formed in young subjects before the time when the last dental germ has arrived at the period of dentification. They are not encysted, whilst odontomes are surrounded by a fibrous sac. This characteristic is not absolute, because some fibrous odontomes finish, as we have seen above, by becoming fused with their membranous envelope, but there still remains another characteristic, drawn from the form and connections of the tumour. The odontome, always perfectly circumscribed, is only in contiguity with the osseous tissue surrounding it, which forms a second cyst. The fibrome developed in the spongy tissue of the jaws is, on the contrary, in continuity for a considerable part of its extent with the substance of the bone, and often also with the fibres and osseous lamellæ of new formation resulting from ossification of the tumour being closely bound up with the adjacent osseous tissue. The consequences of this disposition can easily be forseen. The embryo-plastic odontome can be enucleated without trouble, but the complete enucle-

ation of the fibromes and of fibroid tumours of the jaws is almost always impossible, so that these tumours can only be entirely removed by resection.

2. ODONTOPLASTIC ODONTOMES.

At the time in which these tumours first appear, the dental follicles already enclose special tissues, which become later the agents of dentification. These odontogenical tissues in becoming hypertrophied together or separately, can lose without doubt their property of evolution, but they may also preserve it either wholly or partly; so that odontoplastic odontomes have in general a more or less strong tendency to become dentified.

In man, during the odontoplastic period, the dental follicle only contains two organs; the organ of enamel and the bulb, or dentine organ. The last only is vascular, and it is in its tissue that the work of hypertrophy always begins which engenders odontomes. All the odontoplastic odontomes in the human subject are odontomes of the bulb, although the enamel organ can in certain cases play an important part in the evolution of these tumours. But in pachydermatous herbivora besides the two preceeding elements, the dental follicle encloses a third organ, the organ of cementum, which is vascular like the bulb, and which is susceptible like it of becoming the seat of a work of hypertrophy; thus results a variety of odontomes which are only observed in these animals, and which we shall call *odontoplastic cemental odontomes.*

We shall now study successively two types of odontoplastic odontomes—the bulbous, and the cemental. We shall commence with the latter.

(To be continued.)

LONDON SCHOOL OF DENTAL SURGERY.

DISTRIBUTION OF PRIZES

AT THE DENTAL HOSPITAL, 40, LEICESTER SQUARE.

On the 5th instant a large audience attended in the Lecture room of the Hospital, to witness the first public distribution of prizes of the London School of Dental Surgery.

W. Scovell Savory, Esq., F.R.S., occupied the chair, supported on his right by Campbell De Morgan, Esq.,

F.R.S., and Thomas Underwood, Esq., and on his left by S. Hamilton Cartwright, Esq., and Professor Warrington.

The Dean, Mr. Thomas A. Rogers, said: It is, I believe, customary, upon an occasion of this sort, for the Dean to read a Report upon the condition of the school; but, as this is our first meeting of the kind, and as our institution is still in a somewhat transitional state, from its old to its new home, it seems preferable to leave the Report to—as I hope—a future anniversary, and simply now to say a few words introductory to the business of the meeting. Hitherto, the prizes have been delivered to our successful pupils in the presence of their fellow students, but the Medical Staff thought that it would both shew more appreciation of the efforts of their class, and might, possibly, stimulate the students to even still greater efforts, if the honours, so hardly won, were more publicly distributed, and if the friends of the competitors, and the members of the profession, of which ours is a branch, were invited to witness those honours. As our territory also, is but a comparatively recent addition to the great domain of Surgery, we thought it possible that those who—like yourself—preside over the destinies of that domain, and receive hence frequent candidates for their highest honours might like to see something of the nature of the distant, and but little known regions, whence those candidates come. And we are very grateful to you, Sir, for the prompt and kind manner in which you acceded to my request to preside here to-day, and to our other medical and lay friends for their presence. I may also, especially allude to a very kind letter I have recived from the much-respected President of the Royal College of Surgeons of England, in which he regrets his inability to be present, and speaks very encouragingly of our efforts in the cause of professional education, and of the well-prepared state of the great majority of our candidates for the Diploma.

I must just add one word. Almost at the last moment the Editor of the *British Journal of Dental Science* expressed his wish to be allowed to add a "good conduct" prize to those now about to be given, but illness prevented him from arranging the details till too late for the present occasion; and, besides, I think he would have had to present a prize to every student of this hospital—somewhere about sixty in number, I believe, if "good conduct" were the condition.

He intends, however, to offer one next year; and our friends must, therefore, be prepared to welcome a very paragon of perfection on that occasion.

Our Lecturers will now introduce their successful prizemen, who will receive their well-won honours from the hands of gentlemen distinguished in our own and the allied Professions, and who will add to the value of those Prizes by their distribution of them.

Mr. Makins, Lecturer on Metallurgy, then introduced his prizeman, Mr. Pearman, who received his prize from Professor Warrington, of the Royal School of Mines.

Mr. Turner, Lecturer on Dental Mechanics, introduced Mr. John Bennett and Mr. C. Storer Bennett, who received the first and second prizes from Mr. Thomas Underwood.

Mr. Charles Tomes, Lecturer on Dental Anatomy and Physiology, then presented his prizes, that of 1872 to Mr. David Hepburn, of 1873 to Mr. Ashley Gibbings, and the first and second prizes of the present year to Mr. Thomas Bryant and Mr. M. Storer Bennett respectively. These prizes were delivered by Campbell de Morgan, Esq., who said the pleasure he had in doing so was enhanced by the prizes being given by an old pupil of his own.

The last prize of the day was given to Mr. Bryant by Mr. S. Hamilton Cartwright, Lecturer on Dental Surgery and Pathology, who said:—

Sir,—It was not until very recently that I knew that the successful candidates for prizes in our School were not to receive them at your hands, and my father has been persuaded to undertake the pleasant task whilst entering this room to-day. The gentleman who has obtained the prize in Dental Surgery, is Mr. Bryant, and it gives me great pleasure to have to introduce him to you once again, especially as he has thoroughly deserved the honour which he has obtained. Perhaps here I may be permitted to make a few remarks upon the papers which it was my duty to examine for this competition. Mr. Bryant was *facile princeps*, and then, after some considerable interval, several papers were of such equal merit that it was hard to decide between them. All shewed the results of careful work, but most of them had this fault—one at which you will smile—viz. that I was given *more* information than I sought, though I must qualify this statement by saying on the other hand, that I did not get quite all that which I required. The

questions were not sufficiently attended to, and in some cases answers were given which were quite irrelevant to them. I allude to this, because a knowledge of such failing may be useful to you in future examinations. The true secret of writing a good paper, is, to concentrate your knowledge as much as possible, and to consider each question well before answering to it, in every point and bearing. Then arrange your information on the subject under different heads, and from these work out your answer. Conciseness is thus gained, and the examiner is saved much unnecessary trouble, for however accurate may be the knowledge shewn apart from that required, no marks can be given for such information. I have some little hesitation in alluding to a second fault, had it not been rather a common one, and that was that in some few cases the spelling was not quite according to Johnson and Webster. I mention this because it gives me the opportunity of urging upon the incoming members of the profession, the importance of a liberal, general education, for the professional man is thrown into contact with every class of mind and thought. Do not then give up your old friends, Horace and Virgil, for they will still assist you in many ways, and above all because our language is so intimately connected with Latin, and not least in its medical nomenclature, that we cannot afford to relinquish such friends. I am sure it is a sincere pleasure to all here to see such numerous friends around us to-day, and I feel assured that the satisfaction of our prize-men in receiving their well earned rewards, has been much enhanced by the smiles of those ladies who have so graced our opening day.

In the old days of chivalry their smiles were sought at the point of the lance or of the sword, but now in these days of intellectual culture, and high civilization—chivalric none the less—they can be obtained, as to-day, by the successful results of patient, persevering study, without broken heads or mangled forms; may our hospital be often graced as it has been on this occasion. This, too, is the first time that we have met publicly in Leicester Square, and our presence in it to-day, is one of no small satisfaction. It marks the strides which our branch of the Medical profession has made during late years. Upon the walls of this room you may see the once familiar faces to whom we indirectly owe the existence of this hospital, and our united existence as a

profession, whilst around us now we see the living representatives of those who carried on the noble work commenced by them. May the names of Tomes, Rogers, Harrison, and Hill, and I am proud to say of some nearly connected with myself, never be forgotten. To their labours we owe our present position; the great character of their work was its pure unselfishness. Secure in their own position, they had but one motive, viz., to place others likewise in it. May their names then, be inscribed in golden letters upon the memorabilia of our professional history, and may they serve as an exemplar to the younger men amongst us. Let them but determine to carry on their work in the same noble, unselfish manner, and we may be assured that their speciality will stand *nulli secundus* in its relation to other branches of the profession. Finally may I be permitted to extend a few words of greeting to the new students here assembled—they have entered upon a new country as it were, in which they will find some devious wilds through which they will have to pass, and some steep mountains, which they will have to overcome, the lecturers and teachers are the cicerones appointed to conduct them through these difficulties, and it will be a sincere pleasure to give them all the assistance in our power. Much of their work will be arduous, some even disagreeable, but they must have, so to speak, a *religion* in that work, and with such a feeling all will become easy, even pleasant. Try to do all you can for your profession, work for its good name in every way in your power. There is a crisis in our professional history at present, and perhaps I may be forgiven for saying that our position is not yet quite confirmed; much will depend upon your endeavours in the future. We have recently connected ourselves with the Royal College of Surgeons, an institution whose diplomas carry with them a prestige wherever its name is known, and of which all must be proud to call themselves members. I trust that you will all *at least* take your Dental Diploma there, and by your work shew how worthy you are of your connection with a body so distinguished.

Mr. Cartwright, gave the prize, but would not detain the meeting after his son's remarks.

Mr. Tomes, on being called by the dean, said that the task assigned to him was a most agreeable one. He had

to announce the foundation of a Scholarship, and that our meeting at this time next year would be still more agreeable than the present one, for then, in addition to the usual prizes, a Scholarship in Dental Surgery would be awarded, and if the Chairman would allow him, he would state how this Scholarship came about. Many—though not all present—would know that we came into possession of this commodious building, meeting all our requirements as regards space, light, ample ventilation, suitable position, and all needful professional appliances, mainly through the great personal exertions and pecuniary liberality of one member of our profession. But for him we should at the present time have been struggling in our old home in Soho Square, against the difficulties of insufficient space, bad light, and bad air. He alluded to Mr. Saunders. It was he who recognised in the Leicester Square old houses (in which in their transformed state we now hold this meeting) their capabilities. At considerable cost of time and money he gained possession of them, had plans for their adaptation prepared and then placed them at the disposal of the Committee of Management; and further he personally undertook to see the Hospital removed from Soho to Leicester Square free of debt. The promise has been more than made good. The building Committee at the completion of their work, not only handed over the New Hospital free of debt to the Committee of Management, but with it a considerable sum of money. He (the speaker) did not mean to say that Mr. Saunders did this unaided and alone. On the contrary, he had able assistance and co-operation from many members of the profession, but he did mean to say that the idea originated with Mr. Saunders, and that he devoted very much more time and trouble in the development of our New Hospital, that he gave more largely, and collected from friends more largely, than any other individual, for the purposes of its development.

So fully have Mr. Saunder's services been felt by members of his own profession, that a proposal has been made to present him with a Testimonial in acknowledgment of the benefit he has conferred. In furtherance of this proposal a very considerable sum of money has already been subscribed, and I am empowered by Mr. Saunders to state that he wishes whatever sum may be subscribed for the

proposed object, to be invested for the purpose of founding a Scholarship in Dental Surgery, and thus our Scholarship has come about.

Mr. Savory then rose and said,—First of all let me offer my most earnest thanks to those who have paid me the great compliment of inviting me to occupy this place to day. When my friend, your dean, Mr. Rogers, called on me with this request he will remember that I accepted the invitation without a moment's hesitation. Not unfamiliar with school work, I understood the compliment, but I fear it was only afterwards, when reflecting, that I fairly realized the full measure of my responsibility. But if I were somewhat hasty at first, let me assure you that I amply atone for this now in an almost overwhelming sense of responsibility—of responsibility which must attach to words, not of mine, but to those of any one who ventures to stand where I do now. Let me however have done with myself. Again, I beg of you to accept my warmest thanks for your great kindness, and to bear with me only for a few minutes longer. Let me turn then to the pleasant duty of offering my most hearty congratulations to those gentlemen who have won the prizes which they have received to-day. The distinction is a most honourable one, and in gaining such honours they have given the best pledge at the outset of their career of future eminence and professional success. I would say to you gentlemen, simply, go on. Only accept these rewards not as in any way a title to relaxation of study, but rather as incentives to further exertion. If what you have already done has achieved so much, think of what you may do in the future after many years of still greater effort. Nay, but give yourselves heart and soul to your work without depending or even reckoning on the reward; cultivate by all means in your power the habit of steady and unflinching work—woo it until you come to love it, and then your whole life will be its own exceeding great reward. But for all of you, whether you have gained prizes or striven hitherto unsuccessfully, or not contended at all, there is this great and single fact—that your future career in the profession you have chosen must depend on yourselves. Be not deceived about this. Grasp thoroughly at the outset the truth which sooner or later experience will confirm, that circumstances may be propitious or adverse—friends warm

or cold, many or few, you may fancy that you owe much or little to chance or fortune; but in the long run success or failure will depend and depend only on yourselves. According to your conduct and your work so will your future be. Each one of you therefore, if health and strength be given to him is in this sense master of his destiny. Let me, however, say a word further on the subject of prizes. I know very well that we are not all of one opinion concerning their value, and some go so far as to think that the prize system is productive of more harm than good, inasmuch as by stimulating to the utmost, competition in particular directions, it entices the student into the practice of what is called cramming, and so spoils in him the habit of more sober and solid study which in the long run will lead to a much sounder education. And no doubt there is force in this objection. Only, I would submit that it applies to the abuse rather than to the use of prizes. If a man should set his whole ambition upon prizes and think of nothing outside or beyond them, so much the worse for him. But surely it betrays some ignorance of what the nature of our work is, to suppose that working and working successfully for prizes is at all incompatible with gaining the very best education that any school can offer. If a prize system is judiciously appointed and skilfully carried out it should become a most important means of promoting this great end—it should so accord—be in such entire harmony with the best course of study that these distinctions should shine as lights on the sometimes dreary road which the student has to travel, guiding him by their cheering rays to the higher paths of professional eminence. And surely in these days of competitive examination, it is hardly the time to pass a vote of censure or condemnation on the system of giving prizes. While we struggle for everything else—for power, place, wealth, nay for our very existence, why are we not to struggle for prizes? And let me add this—which after all may go furthest—that a somewhat ample and prolonged experience as a teacher in one of our largest schools, and as an examiner at our colleges and universities has taught me this: that as a rule—subject to occasional exceptions I admit—but as a very general rule the student who shines most in his school and college examinations does the best, is the best man in after life;

and that with us at all events the so-called practical man, who affects to despise everything but what he is pleased to call practical knowledge, is too often the very worst of professional philistines. Why, gentlemen, do you for a moment question this. Then turn to the reports of our schools and the calendars of our universities, and see there if I am wrong. I say, therefore, make not prizes and distinctions of this class the end of your labours, but use them as helps upward and get them if you can. And this tempts me onward to say a few words on the great question—the greatest of all questions for us—the subject of professional education. Do not be alarmed. I have no intention whatever of dragging you through any lengthened discussion concerning past, present, or future legislation on this topic. I was about to add that you have a good guarantee that I shall not trouble you with this; for I myself know very little about it, only I remember, by the way, a remark of the American humourist, that he preferred to talk on those matters of which he knew nothing because he was then least hampered in expressing an opinion. But anyhow I will not trouble you with mine. What I would say of education is only as it concerns you as students, and it comes to this. If I, as a surgeon, may venture to go so far as to offer any advice to you who are to become dentists, it would be, while you are students here, and as students, widen and extend and fortify the basis of your professional education. Be not in a hurry to complete your studies. Be rather anxious to make every step you take secure. Nay, if only you spend the time well you will do wisely to prolong your hospital studies, for it is hardly possible that such precious opportunities can ever recur. And, for a like reason, give good heed to those subjects of your studies which some will tell you are of no practical account. It is not because they are in every sense the most important—no one assumes this—but because when you give up their pursuit here, the chances are that you will never trouble yourself about them afterwards. Remember that all your future labours will be in a special direction; that your work, if it is to be successful in the business of your life, must be hereafter, and even now, directed upon a particular point, upon the attainment of skill in the practice of a special art, and that therefore it will be well for you while you have the best opportunity

for it, to lay the foundation of what may be called a good general professional education. So that you may not merely assent passively to the view, but may come thoroughly to realise the fact that the teeth are parts of the living body and hold certain important relations to various other parts; that they are not isolated structures in their diseases and morbid actions, but suffer in this way more or less like other parts; that in a word, although they have, as every other part has, a special—they have not nevertheless, an isolated pathology. And this because, although they have, as every other part has, a special, they have not, nevertheless, an isolated anatomy and physiology. Naturally parts of a whole, so are they in their defects and diseases. Therefore —and pardon me if the inference be a trite one—therefore to know the teeth well, you must know much of the whole body. You will best work out the diseases of the teeth, not by confining your attention to them alone, but by comparing these with the like morbid actions elsewhere, and so looking at disease here by the light thrown upon it from around. And to know what disease means at all, you must surely first of all know something of health, and so, believe me, you will cure a tooth ache, or prevent one, all the better by and bye by giving attention to anatomy and physiology now. And thus, gentlemen, because as the longer you live and the larger practice you have, so will your thoughts and ideas tend to become concentrated on a particular study, enlarge well and securely the field of your observation and reflection here.

And indeed, I do not think I can overrate the value of the advantages which you students of Dental Surgery at the present time enjoy. I do not know of any step which has of late been taken by our common profession so full of promise to those directly concerned in it as the establishment of a Dental Hospital and a School of Dental Surgery; so full of promise for the future, and even now yielding fruit. If you will only accept these advantages in a spirit worthy of those by whom this great work has been carried out, your profession in its resources will be developed so rapidly and largely that to those looking on it will appear to enter a new phase of existence. Yes, while the full advantage of your most useful art is now no longer limited to those with comparatively ample means, but is given freely —as all such blessings should be—to the poor; you have,

as you should have, scope of investigation, opportunity of acquiring knowledge, such as the most illustrious of your predecessors have never enjoyed. And not only are these incalculable advantages secured to you, but you are now able to obtain the guarantee that you have used them in the Diploma of Dental Surgery, at the College of Surgeons. Here you become educated Dentists, and there you have the means of satisfying the profession and the public that you are so. Am I not justified then in using strong terms when I speak of your present advantages in relation to the past? But, gentlemen, while, as I have said, I do not think I can overrate the advantages which are open to you here, or the value of such a Diploma as now lies conveniently within your reach, yet, need I say, that they even together can by no means supply all the conditions of success. No—you may go through hospital practice and lectures and study diligently, and then obtain without difficulty your Diploma, and still you know you are only on the threshold of your career. So far indeed all is well; but do not fall into the fatal error of concluding that because you have satisfied the examiners at the College of Surgeons, you ought therefore to be satisfied with yourselves. No—while you are earnest students of your art you may indeed, for your own and the public advantage, continue to practise it: but when any one comes to persuade himself that he is a master of it, I fancy the time is at hand when he would do well for his own sake and that of others, to retire from practice.

But indeed I should be sorry to doubt that there are some, many, amongst you, who are resolved to devote all their energy to the work which lies before them. Gentlemen, if you rightly understand the responsibility of the duties you undertake to perform, you need no exhortation from me. You are happy, in that you have ample scope for the exercise of your ability. From a scientific point of view, whether in anatomy or physiology, human or comparative, in natural history, the teeth stand, in interest, second to no organs of the body. In their pathology too; in the diseases to which they are subject, and the changes they consequently undergo, they yield in interest to none. And in addition to the interest which they share with all other structures of the body during life, from their durability through long ages after death, they hold the record

of man's remotest history. By the way, what a strange subject of reflection it is—that the teeth, so obstinately indestructible after death, are so prone to pass away during life. Thus, from the scientific side, there is work and difficulty and mystery enough; and from the side of practice, surely, the art of the dentist yields in usefulness to no other. Oh! the dentist is indeed a useful member of society. Well is it for those who know nothing of the beneficence of his ministrations. But how many are there who can boast thus? Not only is there so often urgent need of him, but the need of him is so universal, and although, as we must all earnestly wish, the art will doubtlessly, nay, must inevitably make great advances in time to come, yet, if I may venture to express an opinion, I would say its present very advanced state is a subject of deep congratulation to us all. Is not the perfection of art, *ars celare artem*, and in this the dentist has no rival.

And now, gentlemen, I have done, for I must no longer trespass on your time. I am not insensible to the patience with which you all have listened to me. To the ladies, especially, I tender grateful thanks, not on my own behalf only, but on yours also, for by their presence here to-day—Need I say how much the success of this proceeding has been thereby enhanced? If ever the time should come that students such as you will have to contend for the prizes of our profession, not with each other only, but with women, too, still I would fain indulge the hope there will always be left to us those women who will accept it as their mission to encourage the students of what may then prove to be the weaker sex. Ah, if amongst our students then anyone could try to win, for with all the talk which has of late beset this subject, a trifling fact seems to have escaped attention. Women—some women at least—may, and very easily if they will, rival, nay surpass men in competitive work; but can men, being men, ever be brought to rival, to contend with, women?

But be this as it may, I trust that meetings such as this will never lack the presence and countenance of ladies. They absent,—and these public honours would be without their chief charm. And as to day in your hour of triumph when all is bright around, you have not looked in vain for woman's approving smile, so henceforward, if clouds should gather and darker hours come, may you still have her help and then the consolation of her sympathy.

Mr. Edwin Saunders then rose and said:—Ladies and Gentlemen, there yet remains one duty unperformed, a debt unpaid, and the grateful task has devolved on me to undertake, however inadequately, its discharge. It is to convey the thanks of this meeting, and in a very emphatic and especial manner, the thanks of the Medical Officers, and of all who have the welfare of this institution at heart, to Mr. Savory for his kindness in presiding on this occasion, and for the graceful and sympathetic manner in which he has discharged the duties involved in the acceptance of that position. Such occasions as these, when successfully conducted, are a great encouragement to all concerned; to Professors as well as to Pupils, giving to the former an assurance of sympathy with, and interest in, their labours in the cause of professional education, and to the latter, a stimulus to profit to the utmost, by those opportunities, to become thoroughly accomplished for their future career. They also serve to cherish and to keep alive those feelings of affection and attachment, which former Students always feel, more or less, for their Alma Mater, and for those to whom they are indebted for much useful knowledge. But, to ensure success on these occasions, the possession of certain qualities is demanded in him who fills the chair. In addition to a thorough comprehension and grasp of the subject, he must possess a logical turn of mind, a mastery of language, a warm imagination and a genial manner, so as to be able to kindle enthusiasm in his hearers and to prevent the proceedings from becoming dull, formal, and tedious; and this combination of qualities is not too frequently found in our profession. Though we may know many who are capable of conveying their meaning perfectly, in the lecture theatre or in the wards of the hospital, there are comparatively few who acquit themselves well on extra professional occasions, and thus it has been alleged against us, and not without some ground, that in eloquence we must yield the palm to the law and the church. We may fairly reply that our eloquence is in our hands rather than in our tongues. The surgeon is called the hand-worker Chirurgus—not Chrysostomus the golden mouthed—and we may safely leave it to others to determine the relative value, under certain circumstances, of the surgeon's hand or the orator's tongue. But there have never been wanting examples of men who, by force of original genius, or diligent

cultivation, have gone far to redeem us from this reproach. Many in this room can call to mind the pungent and incisive rhetoric of Lawrence, and the polished periods of a Joseph Henry Green, nor will we despair while we still have amongst us an Owen, a Paget, and a Savory.

Mr. Edwin Sercombe then proposed a vote of thanks to the Prize Givers, which was accorded with acclamation.

The Chairman then proposed a vote of thanks to the Dean, which being enthusiastically received, the meeting terminated, when an opportunity was afforded the departing visitors to view the various departments of the Hospital.

ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

40, LEICESTER SQUARE, LONDON, W.

AT the opening Meeting of the Session on November 2nd, the following, among other Communications, will be brought forward:—

"On a case of Fractured Jaw treated with Mr. Moon's new Splint." By Mr. CHARLES J. FOX.

"A portion of Tooth imbedded in the Lower Lip." By Mr. FRANCIS MASON, F.R.C.S.

"On the Use of Absolute Alcohol in Dental Operations." By Mr. HENRY SEWILL.

"On Unusual Injuries of Teeth." By Mr. W. G. RANGER.

Models illustrating the Treatment of certain Deformities of the Mouth, will be exhibited by Mr. OAKLEY COLES.

T. H. G. HARDING,
HENRY SEWILL, } *Hon. Secs.*

LONDON DENTAL HOSPITAL.

CASES TREATED FROM SEPTEMBER 1ST TO SEPTEMBER 30TH, 1874.

Extractions. Children under 14	428
Adults	545
Under Nitrous Oxide	210
Gold Stoppings	138
White Foil ditto	40
Plastic ditto	134
Irregularities of the Teeth treated surgically and mechanically	27
Miscellaneous Cases	170
Advice Cases	56
Total	1758

DAVID HEPBURN, *House Surgeon.*

TO CORRESPONDENTS.

ALL communications intended for the Editor should be addressed to the care of Messrs. SMITH, ELDER & Co., 15, Waterloo Place, Pall Mall.

All inquiries respecting Advertisements and Subscriptions should be sent to Mr. GEORGE BUTCHER, 4, Crane Court, Fleet Street, E.C.

THE MONTHLY REVIEW

OF

DENTAL SURGERY.

No. VI. NOVEMBER, 1874. Vol. III.

NEW REMEDIES.

English Dental Surgeons do not take readily to new therapeutic agents, or if they do, are careful to avoid the publication of the results they have obtained. Whether it is an instinctive delicacy, that forbids their putting forward views that may not be in harmony with those held by the introducers of new remedies, or a strong desire to hear first what other people will say—we cannot tell.

It is, however, to be deplored, that new agents, in this country, have not the same chance of a fair trial and an out-spoken experience on the part of the profession as they have in the United States.

It may be, that we are each so satisfied with our own individual judgment that we have no desire to learn from the experience of others, or to presume to contribute to their knowledge of a given material. And yet it has been generally held that the different views of men, when published, have an undoubted value, and contribute largely to the common stock of sound knowledge; and frequent examples of this occur in the purely medical and scientific journals. We hesitate to conclude that it is a want of interest on the part of the members of our profession, in the progress we are making in the treatment of disease. We would rather attribute it to the fact that the Dental Sur-

geons of this country are, as a rule (unlike those of the United States), neither great talkers nor ready writers, and although this characteristic has its obvious advantages, still it is very desirable that the dental journals of England should fairly represent the mental activity of the members of our profession, to an extent, at any rate equal, to that which we find in America and Germany. We have been induced to draw attention to this matter chiefly on account of the brevity of the discussion that took place on "The use of absolute alcohol," at the last meeting of the Odontological Society, and we cannot but regard it as a misfortune that our monthly periodicals show the same lack of interest in the success or failure of new remedies.

THE MONTH.

Mr. Alfred Coleman.

We regret to hear of the illness of Mr. Alfred Coleman; this gentleman has been for some time past in a delicate condition, and his medical attendants have now advised his passing a few months in a southern climate, in order that he may return to town completely restored to health. At the Odontological Society, he will be very much missed, for no member has contributed more to the success of its discussions on all scientific matters, and to the well being of the society at the deliberations of its Council. We are quite certain of echoing the feeling of the members of the profession, when we wish Mr. Coleman a speedy recovery from his present illness, and an early return from his enforced retirement.

Odontological Society of Great Britain.

At the next meeting of the Odontological Society, December 7th, a paper will be read by Mr. Charles S. Tomes, M.A., on "The attachment of the teeth to the jaws." This paper will be of especial interest, as giving the results of Mr. Tomes' recent investigations into the gradual development of the sockets of the teeth; from the lower animals up to man.

National Dental Hospital.

Amateur Dramatic Entertainment.—The Committee of Management of the National Dental Hospital announce that the Whittington Dramatic

Society, whose efforts on behalf of this charity were so successful last year, will give a Dramatic Performance in aid of the Special Fund now being raised to clear off the liabilities of the hospital, at the Royalty Theatre, Dean Street, Soho, Thursday, December 10th, 1874, when will be performed "Checkmate," by Andrew Halliday, Esq., and the drama "All that Glitters is not Gold," by Messrs. T. and J. M. Morton. Tickets may be obtained at the Hospital, 149, Great Portland Street; of Mr. Walter Barnard, 131, Regent Street, W.; Mr. A. Hockley, hon. sec. to the hospital, 45, Great Marlborough Street; or of any member of the committee. The Whittington Dramatic Club has already contributed over £100 to the Special Fund of the hospital.

Professional Hospitality.

We are somewhat unfortunate in possessing no efficient means by which we may receive in a becoming manner those members of the dental profession from the United States and abroad who visit this country; during the past few months Drs. Dwinelle, Kingsley, and Benson, of New York, have been in this city, and but for the care of a few members of the profession (acting quite unofficially), they would have gone away again with but a poor idea of English hospitality. It would surely be no very difficult matter to have a register kept at the rooms of the Odontological Society, or at the London Dental Hospital, so that visitors to this city might enter their names and thus give their professional brethren an opportunity of contributing to the pleasantness of their sojourn amongst us.

Dental Students' Society.

At the last meeting of the Dental Students' Society, held on the 9th inst., an exceedingly interesting paper was read by Mr. Hammond on "The treatment of fractures of the lower jaw." This society is doing very useful educational work, and has the prospect of a very successful session this year.

Dental Education in America.

We are glad to find the Members of the American Dental Association holding such sound views as to the requirements of the profession in the present day, as to pass the following resolutions:—

Resolved, That it is the sense of this Association that no dental student should be graduated by any dental college without at least three years' instruction, including private pupilage and college instruction. The latter should in no case embrace less than two regular full courses.

Resolved, That the Association suggest to the different colleges of this country to appoint a common examining committee, consisting of five members, three to be a quorum, none of whom shall be in connection with any dental college, whose duty it shall be to examine all applicants for graduation and decide upon the same.

ON THE

MICROSCOPICAL STRUCTURE OF FOSSIL TEETH

FROM THE NORTHUMBERLAND TRUE COAL MEASURES.

By W. J. BARKAS, M.R.C.S.E., L.R.C.P. London.

CHAPTER XII.

[*Continued from p.* 205.]

ORDER. GANOIDEI.

The order of fishes designated ganoid has certain peculiarities that clearly separate it from other orders of fishes, at least this applies to modern fishes, the different parts of which can be observed by us in their relation to each other, but unfortunately with the fossil ganoid fishes this cannot always be done, for it is the exception and not the rule to discover their bodies intact. Although fossil ganoids are so seldom found complete, there are still certain characters by which we can classify them in that order. All ganoids possess scales; these scales are usually composed of two structures, an inferior layer of thick, bony, or corneous tissue, and a superior layer of a dense glistening substance called ganoine, but which closely resembles enamel in appearance; in a few fishes, but these exceptions are rare, the scales are thin and unenamelled. The scales are generally rhomboidal in shape and finely punctured; in some of the families of this order they are rounded and sculptured, in others they are quadrate and articulated to each other; this latter form is essentially ganoid, for no other order possesses that character. These scales usually cover the whole body, and in some fishes fulcral scales are arranged along the anterior rays of each fin, another character found in ganoids alone. The endo-skeleton of the fishes of this order is sometimes ossified completely, more frequently it is not so, some families having the endo-skeleton only partially ossified, and others not at all, but in all cases the bones of the head are distinct one from the other, thus affording us a ready means of diagnosis between ganoids and selachians. All ganoids possess operculæ, and they are the only operculated fishes in which the vertebral column is frequently undivided, but forms one continuous spine; there are plenty of exceptions, many fossil ganoids having distinct vertebræ. The teeth of this order of fishes are generally anchylosed to the jaw, but in some cases they are fastened in sockets, and in others they are

Fig LIX



Palæoniscus. Maxilla.
Nat Size.

Fig LX



Palæoniscus. Mandible.
Nat Size.

Fig LXII



Palæoniscus. Large tooth shewing portion of tip.
Vertical Section. Magnified 200 diam.s

Fig LXI



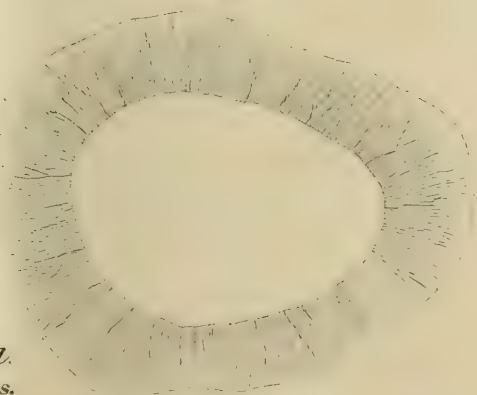
Palæoniscus. Mandible.
Vertical Section. Magnified 20 diam.s

Fig LXIII



Palæoniscus, minute tooth shewing tip of enamel.
Vertical Section. Magnified 250 diameters.

Fig LXIV



Palæoniscus. large tooth.
Transverse Section. Magnified 200 diam.s

T. Bessent, lith, 29, Essex St, Strand.

held firm by means of roots projecting into the bony tissue of the jaw. We have another very ready means of learning to what order a Coal Measure fish pertains, because it is said to be an established fact that the only fishes found in that formation are either Plagiostomes or Ganoids, and if such is the case, there can rarely be any difficulty in distinguishing between these two orders, but Günther in a paper on "Ceratodus," in the "Philosophical Transactions for 1871," endeavours to prove that fishes of the order Dipnoi existed during this and the Devonian periods, but the question is not fairly settled as yet, though I am inclined to think his reasoning is correct.

The order of ganoids is subdivided into various families, sub-families, and genera, but the whole is still in a state of great confusion, for nearly every author that has written on this subject has propounded a classification of his own construction. The arrangement enunciated by Professor Huxley in the "Memoirs of the Geological Survey of Great Britain," Decade X. is the best that I am acquainted with, but even it will require copious alteration before it will embrace all fossil ganoids, and some of the fishes he calls ganoid belong according to Günther to the order Dipnoi. As I cannot claim to be sufficiently acquainted with ichthyology to attempt to rectify his synopsis, I have adopted his subdivisions into families and sub-families, but in the case of the genera I have had to follow my own ideas to a great extent, for no palæontologist has yet attempted to classify all the fossil genera into families respective families. It is my intention to direct your attention merely to those families that include the Coal Measure fishes, all others, therefore, I shall pass over without notice.

FAMILY. LEPIDOSTEIDÆ (HUXLEY).

This family is distinguished from the other ganoid families by the possession of an heterocercal tail, rhomboidal scales, branchiostegal rays, a pre-operculum, an inter-operculum, and non-lobatē paired fins. Professor Huxley has divided this family into two sub-families, Lepidosteini and Lepidostini. In the former the maxilla is composed of more than one bone, and the branchiostegal rays are few and not enamelled: in the latter the maxilla consists of one bone only, and the branchiostegal rays are numerous and enamelled, the anterior one taking the form of broad plates.

Such is Huxley's arrangement of this family, and there can be no doubt that it is a good one, and that it includes Palæoniscus among its genera, but whether Pygopterus, Acrolepis, Gyrolepis, and Cycloptychius are members of it, is not settled satisfactorily as yet, though seeing that their teeth, scales, head, &c., resemble Palæoniscus to a certain extent, I am very much of the opinion that these genera do belong to the Lepidosteidæ. I do not intend to enter into a discussion in these papers as to the proper classification of these ganoid fishes, because many other points besides the teeth would have to be taken into account, and I wish these papers to be essentially expositions of teeth structure. It must therefore be understood that the classification I adopt here is not necessarily, even in my opinion, correct, because some of the genera are only fragmentary, or their affinities are not yet determined, so that it is impossible to classify them; when such is the case I have arranged them according to their tooth structure.

GENUS. PALÆONISCUS (AGASSIZ).

This genus is synonymous with the Palæoniscum and Palæothrissum of De Blainville; its period of existence was comparatively short, for it extends only from the Carboniferous era through the Permian to the Triassic. Though it enters into the Trias it is essentially a Palæozoic fish, for during the Carboniferous and Permian ages it swarmed, while in the first-named formation it was very rare, still it is an example of the artificial nature of the division of the strata into Palæozoic and Mesozoic periods. There can be no doubt that these two eras possessed an almost entirely different fauna from each other, but there are numerous instances in which Palæozoic fishes have extended to Mesozoic times. The species of this genus are exceedingly numerous: I have seen descriptions of 49, of these 25 are found principally in the Carboniferous formations, 18 in the Permian, 1 in the Triassic, the remaining five belong to one or other of these formations, but I cannot find out which; it must, however, be remembered, that some of the Carboniferous species extend to the Permian period and *vice versa*.

According to Sedgwick and McCoy, in their work entitled "British Palæozoic Fossils," Palæoniscus varies in size from moderate to very small, (I have seen them vary

from 1 to 12 inches in length); body fusiform, deep between the pectoral and ventral fins; tail heterocercal, forked, large, upper lobe longer and narrower than the lower, with the body extending to its extremity; fins rather small, particularly the pectorals and ventrals, none of them reaching to the origin of the next behind, but all possess strong fulcral scales, anal fin commonly smaller than the dorsal, the latter is opposite the space between the origins of the ventral and anal fins; the jaws are large, but the teeth "en brosse," and so minute as to be scarcely visible to the naked eye; the muzzle projects beyond the jaws from an expansion of the pre-frontal and nasal bones; scales moderate, rhomboidal, smooth, or finely striated longitudinally; the species with small scales are more slender than those with large ones; in some of the species the fins are covered with rows of scales, each of which rests upon two adjacent rays. Add to these characters non-lobate paired fins and numerous enamelled branchiostegal rays.

These, then, are the general characters of the genus, and they correspond with those of the sub-family Lepidostini. The differences of the species arise from the variation of the size and shape of the body of the fish, and from the characters imprinted upon the scales; the teeth and jaws in all the species being similar in shape though differing a little in size and occasionally the markings on the surface of the jaws vary to a slight degree. Very few authors touch upon the teeth and jaws of this fish further than Sedgwick and M'Coy have done; in fact I only know of three, Mr. Binney, Messrs. Hancock & Atthey, and Professor Owen; the last gentleman did not describe them intentionally, but, nevertheless, he did so while detailing the structure of Ganacrodus hastula to the Odontological Society in that exceedingly erroneous paper of his upon the "Dental Characters of Fossil Fishes." Messrs. Hancock and Atthey have described the teeth of this genus so minutely in the third volume of the "Transactions of the Northumberland and Durham Natural History Society," that I have very little new ground to go over, and the remainder of this paper is almost a corroboration of theirs; the only point they have not dealt with is the structure, and even here I have been forestalled, because Professor Owen's description of the structure of Ganacrodus is, with one minute exception, exactly that of Palæoniscus.

The general shape of the maxilla and mandible is very well shewn in Figs. LIX. and LX., and it will be observed that the maxilla is formed of one continuous bone; but in the opinion of some palæontologists, Palæoniscus is considered to possess a pre-maxilla, although it has never yet been discovered. If it does possess a pre-maxilla, it is rather curious that it has never been found, for specimens of this fish are frequently obtained perfect in every respect, except that they have not this bone. Should Palæoniscus be found to have its superior jaw formed of two bones, a maxilla, and a pre-maxilla, it cannot be classified, in either of the sub-families into which Professor Huxley divided the Lepidosteidæ; the external surfaces of these jaws are marked by fine curved ridges running horizontally and parallel to the superior and inferior borders, these ridges branch very freely, and the branches join the neighbouring ridges to form a network. The teeth are arranged along the alveolar border of the jaw in two rows, one of large laniary teeth, and the other of small teeth; the large teeth are placed internally, they are arranged with distinct intervals between them, and at about equal distances from each other; the minute teeth are very numerous, and are not always in regular order, being sometimes crowded together. In both these varieties the teeth are conical, with very sharp apices, the small ones are straight, but are sometimes curved, the large ones are always curved, the curve being usually inwards, but often with a tendency forwards at the same time. The teeth, according to this description, can hardly be said to be "en brosse," as stated by Agassiz, and by nearly every palæontologist that has written since Agassiz's wonderful work came out. Agassiz also remarked that the teeth are so minute that it is difficult to distinguish them. Certainly, the minute teeth of the outer row are hard to distinguish with the naked eye, but I think it would be difficult not to see the inner row of large teeth in the figures I have given of the maxilla and mandible; with a hand-glass the outer row can easily be observed. With regard to the general character of the teeth I cannot do better than quote the description given by Messrs. Hancock and Atthey in their paper on Palæoniscus, that I have already referred to:—"The teeth are sharp pointed and conical; they are a little recurved, the bend being usually greatest a short way above the base.

Fine large specimens are upwards of one-eighth of an inch long; but they are generally much less; they vary considerably in this respect in the different species. They are most frequently wide at the base, and contract rather suddenly immediately above; thence the attenuation is very gradual, until within a short distance of the apex, a little below which the crown is slightly swelled; from this point the sides of the tip incline more rapidly towards each other, and unite to form an extremely sharp apex. In some species the apex is much produced and attenuated, in others it is comparatively short; but in all it is characterized by its sharpness. The sharp pointed tip or apex is formed of a thick cap of enamel, and is usually quite smooth and highly polished. Below the cap, in all the species examined, the crown has a subdued lustre, and is fretted in a very beautiful manner with numerous minute, short, close-set, longitudinal depressions, which being arranged lengthwise, have occasionally a lateral inclination; hence the peculiar fretted appearance of the surface. On making a longitudinal section, the pulp cavity is seen to conform to the shape of the crown; the cavity is wide below and narrow above, tapering gradually towards the apex and terminating just within the extremity of the dentine. The tip of enamel fits on the top of the dentine like a ferrule, and is in the form of an inverted V, with the angle filled up for some distance, and the stout limbs turned out a little below and mortised, as it were, into the dentine. The enamel cap varies a little in form in the different species, but it varies still more in accordance with the plane of the section. When the section is made directly through the centre, the solid apical portion of the enamel is seen to be much produced and very sharp. By making the section a little eccentric, the solid tip is reduced in length and sharpness; and by carrying the process a little further, the enamel cap becomes a mere thin covering; and at last it entirely disappears, and is replaced, as it were, by a somewhat obtuse point of dentine. In the finest specimens, the whole tooth below the enamel-cap is coated with a thin film of enamel, which is perfectly colourless." Figs. LXII. and LXIII. exhibit very clearly the difference of form of the enamel tip from the cause mentioned by the above authors; Fig. LXII. is a section of a much curved laniary tooth, so that in grinding the tooth down the point

has been rubbed away, leaving a blunt apex; in Fig. LXIII. the apex remains sharp and perfect, because the tooth was a straight minute one. It will be observed that in the above description the authors state that the largest teeth measure upwards of one-eighth of an inch in length, and that they have examined teeth of Palæoniscus coated with a thin layer of colourless enamel. Now in none of my Coal Measure specimens do the laniary teeth attached to the jaw measure more than one-fifteenth of an inch; nor do any of the fifty-five teeth *in situ* upon the jaw that I have examined under the microscope shew the slightest trace of enamel below the tip; I have seen teeth *detached* from the jaw one-eighth of an inch in length, and possessing a coat of enamel, but I do not consider them to belong to Palæoniscus, but to Pygopterus, Acrolepis, or Gyrolepis. Whether Messrs. Hancock and Atthey have made these two statements from an examination of the detached teeth alone I do not know.

A vertical section of the teeth in the jaw shews them cut through at all angles, as in Fig. XLI., in that illustration it will be noticed that one tooth, and that a minute one, exhibits the enamel tip. The pulp cavity of the tooth is connected with large sinuses running through the tissue of the jaw-bone. The structure of the jaw varies in different specimens, in some it resembles cartilage, at any rate it is not true bone, because there are no Haversian systems, there are large irregularly shaped sinuses which may be called vascular, but there are no lacunæ nor canaliculi, these sinuses run parallel to the alveolar border, and branch and anastomose freely in some cases, but sparingly in others. In three of my sections, true bone structure is observed, there are Haversian canals, running parallel to the alveolar border, which are smaller than the sinuses, and of a regular calibre, they branch and anastomose occasionally; around these canals are oblong lacunæ, but they are few in number, from them radiate numerous canaliculi. The cause of this variation I am at a loss to account for, because all my sections for this paper have been prepared from undoubted jaws of Palæoniscus. Dentine and ganoine are the two structures that enter into the formation of these teeth. The dentine is composed of a series of calcigerous tubules ramifying in an homogeneous matrix. For the description of the tubules in the dentine and

enamel I shall quote Professor Owen's account of them in his supposed new genus Ganacrodus, for there is hardly the slightest difference between them. Ganacrodus I do not consider to be a tooth of Palæoniscus, but of Pygopterus, Acrolepis, or Gyrolepis, the structure in all these genera is so very alike that one description would almost apply to them all. My reasons for considering Owen's supposed new tooth to belong to one of the above three genera I shall mention when describing Pygopterus. "The tubules of the dentine have a diameter of one one-thousandth of a line at their origin (the twelve-thousandth of an inch), and are resolved into more minute branches in a clear dense ganoid substance one third of the way towards the periphery, and at the upper narrower part of the crown at one half of the way thereto. The general direction of the dentinal tubules is transverse, or at right angles to the surface of the crown. At the base of the tooth the first short 'primary curve' has its concavity basewards, the rest of the tubule takes an opposite bend, but in a slight degree; at the apical third of the crown the first primary curve is obsolete, and the second one concave pointward, prevails to the terminal resolution of the trunk tubules. The interspaces of these rarely exceed twice the diameter of the tubules. Throughout their course they are minutely, but somewhat irregularly and slightly undulated, with occasional dichotomous divisions prior to resolution into the finest branches; they give off such ramuscules into the clear interspaces before terminal resolution. * * * In the tissue of the ganoine, which shines conspicuously by transmitted light, in contrasted clearness and lightness of tint with the darker dentine, very fine tubules or striæ may be discerned; some are seemingly in continuation with the apical tubuli of the dentine and continue their direction, which tends more and more towards the apex, deviating gradually from the general more transverse course below the ganoine." Such is also the structure of the teeth of Palæoniscus, the only alteration that is required is that in Palæoniscus the tubules measure at their origin from one-twenty to one-thirty-thousandth of an inch. Figs. LXII., LXIII., LXIV. shew the structure of the dentine and enamel very fairly, but the tubules are so very fine that is difficult to define them clearly even under 250 diameters.

I am sorry that Professor Owen published his paper on the "Dental Characters of Fossil Fishes," because it is very evident that he never made the slightest enquiry as to what was known about Coal Measure fossil teeth, in fact he does not appear to have made any researches at all; take the glaring example of his supposed new genus, Ganacrodus; he writes about its peculiar structure (meaning the enamel tip) as being a structure "which arrested my attention with increasing interest as I proceeded with the examination, inasmuch as I had not before met with any similar structure in the whole range of my odontological researches." Now Professor Agassiz had described tipped teeth, in his "Poissons Fossiles," years before, and it was well known among Coal Measure palæontologists, in this district at least, at the time his paper appeared, that Palæoniscus, Pygopterus, Acrolepis, Gyrolepis and Cycloptychius, all possessed teeth tipped in this manner.

NOTES ON ABNORMAL CASES.

By TOLLEMACHE J. BULL, Brussells.

Supernumerary teeth are not so uncommonly met with as to render them subjects for particular notice, but it is not often that one finds them uniform both in appearance and position.

The accompanying engraving is from the model of the mouth of a young American lady. Her teeth are more than usually faulty; she has lost her six-year-old molars from decay. The supernumerary tooth on the right side has two sharply defined cusps, and, at first, its appearance led me to suppose it was two teeth, but this I have found to be erroneous, those on the left side are less defined, the tooth altogether being smaller, though partaking of the same form.

It was my wish to have removed these, in consequence of their obstructing the closing of the gaps formed by the removal of the first permanent molars, and thus relieve the pressure on the front teeth; also to enable me to put in a filling in the mesial side of the second right molar, which is badly decaying, and blocked by the supernumerary tooth, and this operation was agreed upon until my patient men-

tioned the circumstance to a friend, who dissuaded her from having it performed under pain of having the jaw broken, which she was assured would occur from an attempt to remove an abnormal tooth. Knowing the nationality of my patient and her friend, I was the more surprised to hear such nonsense.*

About a month ago, I removed an amalgam—filling I can hardly call it—from between first and second superior molars. It had been put there by a lady *dentist* in Lille, a few weeks since, and, originally, about $\frac{1}{16}$ of it was in a cavity, but in reality it was plugged between the two



teeth, and allowed to harden. As a result, excessive tenderness was caused to the teeth, and gums, accompanied with a most unpleasant taste.

It is not an unusual circumstance to come across one plug in two teeth, and I am sometimes asked to do this sort of work, the patient being of opinion it would be more comfortable than having the space, which forms a receptacle for food. I have also by me an amalgam plug, likewise inserted by a French dentist, having about the durability and colour of lead, and which cuts as readily. It gives off mercury freely upon being thoroughly heated, and after

* A short time since I was called upon to remove a superior molar from the servant of a medical man. It was quite an ordinary case, but the woman was prostrated with having suffered for nearly three months in consequence of an old and respectable practitioner in this city refusing to operate, and telling her that if the tooth were removed she would lose her eyesight on that side.

having been in the mouth about three or four months in an inferior molar retains its brilliancy. It was easily turned out entire from the cavity it was intended to fill, caries not having been arrested.

ODONTOMES.

(Traité des Tumeurs. Par Paul Broca).

(*Continued from page* 169.)

A. CEMENTAL ODONTOPLASTIC ODONTOMES.

There are, in the museum of the school of Alfort, two specimens of this kind of odontome. A third specimen, belonging to M. Leblanc, has been unfortunately lost, but the descriptions and the drawings published in 1859 by M. Forget, allow us to add it to the variety that we describe here.

I obtained permission to make a section from one of the specimens at Alfort, in order that I might submit it to microscopic examination. A section of M. Leblanc's specimen has been in like manner studied by M. Robin. It is with these materials, restricted as they are, that I shall endeavour to describe cemental odontoplastic odontomes.

The odontome at Alfort has taken the place of the fourth molar in the lower jaw of an old horse. This tumour, very irregular in its outline, is about five centimeters in diameter in every direction (Fig. 13). After having dilated the alveolus in which it first appeared, it was encysted like a normal tooth, and took its position between the third and the fifth molar. Fixed firmly in its alveolus it could, like an ordinary tooth, serve for mastication, and its extra-alveolar portion had been deeply worn away by the corresponding teeth of the upper jaw. The abrasion of this tumour was greater than that of the adjacent teeth. This shows that the tissue of this odontome was less hard than that of a normal tooth. If we remember besides that the animal was old and that the general abrasion of the teeth was pretty well advanced, we are led to conclude that the tumour must have shown formerly much greater vertical dimensions than is to be seen at the present day.

This tumour filled the entire alveolar cavity, and to extract it it was necessary to cut part of the alveolar process. I have proved, then, that an irregular conical cavity whose open-

ing was about two centimeters in size, corresponded to the deep side of the odontome, and penetrated the dental mass to the depth of more than three centimeters. This cavity, now entirely empty, evidently enclosed formerly a soft substance more or less analogous to the dental pulp, but the specimen having been macerated before being dried, we cannot affirm that the pulp in question existed when the horse was sacrificed. It is, nevertheless, extremely probable, because the tumour had not provoked around it any inflammation. It had not behaved like a foreign body, but like a normal tooth; there

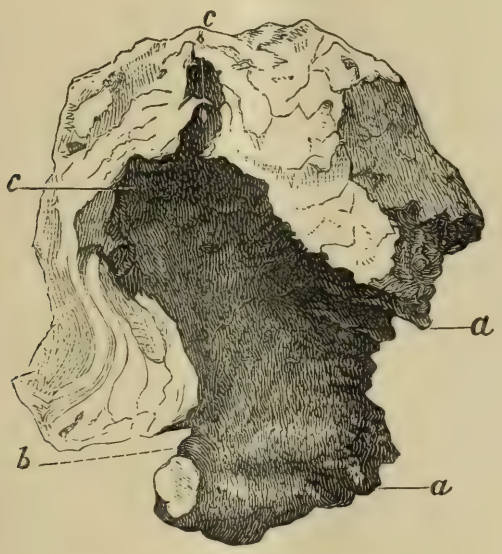


Fig. 13.

is, then, reason for believing that up to the moment of death the cavity had been filled with a soft vascular substance playing the part of the dental pulp. The section, examined with the naked eye, shows linear, irregular, sinuous marbling, many marblings almost parallel to the corresponding surface of the tumour. The largest part of the morbid mass shows a light yellowish colour, upon which are clearly to be seen some lines lighter and other lines of the whiteness of enamel. With the microscope are found that these white lines consist, some of dentine, the others of enamel. The enamel is rather more abundant than the dentine; these two tissues, distributed without any order, are rarely in contact with each other, they are, in a man-

ner, drowned in a mass of cemental tissue which forms, I repeat, the greatest part of the tumour. It would be superfluous to prove that this is an odontome, but we seek to find the epoch in the development of the teeth in which this tumour extended. The embryo-plastic period was already passed, the formation of the three definite tissues of the teeth prove effectively that the three organs, generators of the cementum, dentine, and ivory were already developed. The period of the formation of the crown had not yet been attained, seeing that on no part was found the dental tissues regularly placed as they are both upon a completed crown or a simple cusp. This is therefore an odontome of the second period, that is to say, an odonto-plastic odontome. Which is now, of the three organs which existed in the dental follicle of this period, the one which was the starting point for the odontome? It appears certain to me that it was the cementum organ. The hypertrophy of this organ had consequently impeded the development of the two others, probably even caused atrophy in parts. The result was, on the one hand, that the ulterior production of the cementum was exaggerated, on the other hand, the other tissues were rendered very imperfect and very irregular. The hypertrophied cementum organ thus disassociated the two neighbouring organs, in places penetrated them, interposed itself between them, was prolonged as far as the dentinal cells, so that the dentine and enamel could only be developed in the form of thin, wavy, and discontinued lines, at those spots where the generative elements of these tissues had not already been destroyed. The tumour then merits the appellation, cemental odonto-plastic odontome. In this case the hypertrophy of the cementum organ has only troubled and disturbed the evolution of the bulb, properly speaking. But it may readily be imagined that this hypertrophy might go much further and determine complete atrophy of the enamel organ and the corticle layer of the bulb, in such a manner as to render quite impossible the production of enamel and dentine, so as finally to constitute a tumour exclusively cemental. This variety probably exists, though I know of no example of it. We can understand, again, that the cementum organ could be developed in the form of a tumour, without being in communication with the two other odontogenic organs, and that these simply pressed

towards the base of the follicle might, although hindered in their evolution, give rise to a dentification more or less regular. In fact the cementum organ receives direct its vessels from the follicular wall, and is only contiguous to the enamel organ, which separates it from the dentine organ; it seems then possible that in hypertrophying it isolates itself more and more from the two other organs, and that dentification once terminated, we find in the same cavity, in the same cyst, on the one hand a cemented mass proceeding from the cementum organ, and on the other a formed tooth, more or less rudimentary, proceeding equally from the organs of the cementum, dentine, and enamel. Thus may doubtless be explained the disposition which exists in M. Leblanc's specimen. We have to deal with a voluminous osseous cyst, situated on a level with one of the canines in the upper jaw of a horse. An abscess had formed in the interior of the cyst, opened spontaneously in the mouth and remained fistulous. In opening the tumour after the death of the animal, M. Leblanc found, to begin with, in the cyst an ossiform mass, the size of an egg, formed of two rounded lobes with a third lobe irregular and aufractuous. This mass, completely free in the cavity of the cyst, appeared to fill it entirely; but after having taken it away there was found at the bottom of the cavity at the spot furthest removed from the alveolar border, a very rudimentary canine tooth fixed by its base upon the floor of the cyst. I here describe the specimen according to the very careful drawing published by M. Forget.* We read it is true in the text which is very short, that this canine tooth "shows a natural development;"† but I think that M. Forget wished merely to say that it presented the appearance of a tooth in opposition to the ossiform tumour which resembled no known organ. It is in fact sufficient to throw a glance at the plate to see that this tooth far from being normally developed is quite rudimentary, that it is incomparably smaller than the crowns of the incisors represented in the same drawing, that it has no root, that it has neither the form of a perfect canine, nor of a canine in the course of formation, nor that of any other tooth completely or incompletely developed.

* Forget, *Des anomalies dentaires*, &c., Paris, 1859, in 4to, planche ii., fig. 5 et 6.

† *Loc. cit.* p. 28.

Let us say then that the cyst in question encloses a voluminous ossiform mass, and a little rudiment of a tooth, which according to the situation of the tumour must be considered as representing the canine tooth.

The ossiform mass has been examined with the microscope, and M. Robin has proved that it is a production *exclusively cemental.* The adjacent tooth was not examined, M. Forget considering that it was completely isolated from the cemental mass admitted that the latter was quite independent of the tooth, and that its formation and its growth were "entirely strangers to the organic operations to which the tooth owes its development,"‡ and he concluded that it was due to a secretion of the alveolar dental membrane. But he has not given credit to the difference which exists between the odontogen of the human subject and that of the horse; and if he had known of the existence of the cementum organ in the pachydermatous herbivora, it is to this organ he would have attributed, I do not doubt, as I have done, the formation of the cemental tumour.

I much wished to have examined this remarkable specimen myself, but M. Forget had returned it to M. Leblanc. Unfortunately M. Leblanc cannot find it, and fears it must be lost. In analogous cases which may present themselves later, it will be important to study carefully the rudimentary tooth, adiacent to the cemental odontome; I have reason to believe in fact, that this tooth developed at the expense of a bulb separated from the cementum organ should be wanting in the cemental skin which surrounds the normal dental crowns in the horse.

HOW SOLUBLE IN WATER IS ARSENIOUS ACID?

(Popular Science Review.)

This question is answered in a late number of the "Bull. de la Soc. Chim.." by M. L. A. Bücher. He says that 1 part of crystalline arsenious acid dissolves, after 24 hours' digestion, in 355 parts of water at 15° C. The amorphous acid, in the same conditions, requires 108 of water. If the crystalline acid has been dissolved at a boiling heat, and the solution left to stand for twenty-four hours, it contains to 1 part of acid 46 of water. The amorphous acid, in the same circumstances remains dissolved in 30 parts of water.

‡ *Loc. cit.* p. 29

ON "AN UNEXPECTED PROPERTY OF ADHESIVE GOLD."

(Johnston's Dental Miscellany.)

Messrs. JOHNSTON BROTHERS:—After reading the article in the April number of your *Miscellany*, by Thomas Fletcher, Esq., F.C.S., on the above subject, I was not surprised at the conclusions arrived at. I had had for a long time an idea that the adhesive gold fillings would not hold water or preserve a tooth as well as soft gold foil or tin foil. It seemed to me quite a natural and philosophical principle that to wedge gold in a tooth would preserve it water-tight better than to build from a retaining point, and depend on driving every particle of gold separately against the walls of the cavity. Well, though, as I say, I felt almost sure that this was true, I thought I would, as Thos. Fletcher, Esq., did, demonstrate the fact, so that I could *show*, if necessary, the proofs of this statement. I therefore made the following experiment:—

Taking the small round ivory handle of a broken mouth-mirror, I drilled an irregular cavity in the end, and after filling it, sawed off the end, leaving a very pretty little cylinder of ivory with a gold filling in one end. I drilled another cavity, filled and cut off as before. This I did five times, making the following record.

No. I. Cavity filled with soft, unannealed cylinders, using two No. A 3, and four No. A 1 cylinders.

Time occupied in introducing the gold, not quite five minutes; force, hand pressure.

No. II. Cavity filled with adhesive gold foil, No. 5, rolled into rope, and cut off in convenient pellets. Finished with No. 60 foil in single layer; hand pressure. Time, seventeen and a half minutes.

No. III. Cavity filled with a sponge gold made in Vienna; hand pressure. Time, eight minutes.

No IV. Cavity filled with Fletcher's Gold, and Platinum alloy amalgam.

No V. Cavity filled with tin foil. Time, four minutes.

After waiting a week for the amalgam to contract, expand, or change as it pleased, I dropped the little ivory cylinders into a glass of colored water, and left them twelve hours, removed them, and laid them in the sun to dry. After this I sawed carefully through each cylinder

and filling, and examined closely for a *leak*. The outside of the ivory and fillings were thoroughly stained.

What was my surprise at finding *not the least sign of a leak* in any cavity, excepting the one filled with tin foil. This was a very small leak at one side, and proved to me that the foil was too heavy for the pressure applied. Every one of the gold fillings and the amalgam was perfect, and none of the cavities were regular, as I had left angles in all of them. Will some other, or a number of gentlemen, experiment, and let us know the results? The subject is an important one.

I honestly acknowledge that I was surprised at the results of my experiment, as after the statements so startlingly and forcibly made, I felt almost sure of finding the soft gold foil, and the tin foil fillings, and *perhaps* the amalgam, water-tight. I did not smile the "superior smile," for I did not think the sponge gold nor the old-fashioned adhesive pellets *would* make water-tight fillings.

I worked rapidly, as you can see by the *time* I've given above, and especially with the sponge gold; for with this I tore off a large piece that nearly filled the cavity after condensation, and simply *rammed* it into the cavity.

Let us have some more experiments, honest and true, and in a multitude of testimony truth may come out.

C. M. WRIGHT, D.D.S.,

Ex-Professor of Mechanical Dentistry in Ohio Dental College.

Basel, Suisse, April 28th, 1874.

THE PRESSURE OF THE SALIVA IN THE GLANDULA SUBMAXILLARIS.

THE pressure of the salivary secretion in the duct of the submaxillary gland has long been known to be remarkably high. Hering has investigated the reason of this (*Wien. Sitz.* 1872, iii., 2), and finds it is due to the circumstance that this gland secretes a colloidal substance having a remarkably high endosmotic equivalent. This colloid substance is probably mucin. The only difficulty is to explain the rapid formation of this under nervous influence; but the difficulty is only apparent, since a very delicate membrane alone intervenes between the mucin contained in the cells and the interior of the tubuli of the gland.—*Lancet.*

FORGET ON RANULA.

[*London Medical Record.*]

L'Union Médicale of June 25 and 27, contains a paper by M. Forget upon foreign bodies in Wharton's duct, and in connection with ranula, which was read at the Surgical Society. M. Forget deals critically with two papers bearing on the subject, the one by Dr. Claudot, the other by Dr. Ferrier.

M. Claudot's consists of two parts. In the first he narrates various cases of ranula, and concludes that they differ in their origin, their seat, and their nature. Hence, he classifies them into

1. Mucous cysts (dilatations of the muciparous follicles).
2. Salivary cysts (distensions of the salivary ducts).
3. Serous cysts (Fleischman's bursa).
4. Dermoid cysts (closed cavities of new formation).

M. Forget, passing over the earlier parts of the essay, takes exception to the serous cysts which are said to have their origin in Fleischman's bursa. M. Claudot gives no proof of the anatomical existence of such a bursa. He only says that in 1842 Fleischman believed he had discovered one in the linguo-maxillary furrow, and that he there fixed the seat of ranula. But, unfortunately, the description Fleischman himself gave of it showed that it was nothing but the lax cellular tissue which all anatomists have recognised in that situation. Neither does Jobert (De Lamballe), who follows Fleischman, give any anatomical proof of the existence of the bursa. According, to him the direction and shape of the serous cyst itself indicate the situation and direction of the bursa, which has been its original point of departure. The tumour, he says, becomes prominent at the side of the tongue. It is never situated in the central line, because of the resistance of the thick muscular plane there formed by the genio-glossus, the genio-hyoid, and the digastric muscles; it tends, therefore, to place itself at the sides, and to insinuate itself between the muscles and the submaxillary gland; it may develope itself on both sides, and may become prominent at the same time both in the neck and in the mouth.

Now, says M. Forget, it is incontestable that sublingual tumours which offer these clinical features form the great majority of what are commonly called ranulas; must we

then conclude with Jobert, not merely that they occupy a closed cavity formed at the expense of the laminated tissue, but even that they arise in a pre-existing natural cavity, which was discovered by Fleischman, and re-discovered by M. Tillaux. It must rest with anatomists to decide who are right; but at present the balance of authority is against Fleischman. M. Tillaux says the bursa is not always found. Well then, it has probably no very important physiological use; and this leads us to ask whether, when it exists, it is not merely accidental or abnormal? If it had a physiological use it would be constant.

M. Tillaux has striven to show that the accumulation of saliva in this cavity, from a communication with Wharton's duct, gives rise to cases of acute ranula. But the proof is defective, while on the other hand M. Dolbeau has cited cases of acute ranula arising spontaneously, whose sudden appearance could not be explained upon the theory suggested by M. Tillaux; and the author has himself reported a case of the same kind which could not be explained in this manner. There is, therefore, need for further investigation before the point can be considered settled.

The second part of M. Claudot's essay is occupied with lesions of the salivary ducts, produced by foreign bodies in their interior. Of these foreign bodies some are introduced from without; others, such as salivary calculi, have their origin within.

A few examples are given of foreign bodies introduced from without. The first is that of a shoemaker, who had a painful swelling in the region of the submaxillary gland, with ulcerations at the orifice of Wharton's duct. A probe was passed, but no calculus or other foreign body could be felt. Three months later the patient complained of pricking pain under the tongue. The surgeon examined the floor of the mouth, and drew out a pig's bristle, such as the man used in his trade. He speedily recovered.

The next case is that of a soldier, who had a fluctuating tumour, the size of a pigeon's egg, beneath and to the outer side of the tongue, in the region of the submaxillary gland.

There was also a second almond-shaped swelling, of which the narrow end corresponded to the orifice of Wharton's duct. M. Claudot thought at first that these swellings were probably connected with a concretion in the

salivary ducts. However, after making a close examination, he came to the conclusion that there was no foreign body present. After using palliative treatment for a week with little effect, he slit up the orifice, and the bistoury struck a small, rough body, which was drawn out, and proved to be a fragment of an ear of corn, upon which the salts of the saliva had formed a concretion. The cure was rapid and complete.

A third case is that of M. P. who, after having supped upon fish, awoke in the night with sharp pain and swelling in the region of the sub-maxillary gland. Leeches were applied, and some relief given. Between 1837 and 1842 the patient suffered two sharp attacks similar to the first. All this time the swelling continued; the pain got worse and worse, the tongue deviated, and mastication was impeded till at length M. P. could only take fluid food. It was not till 1842 that the surgeon probed Wharton's duct, and detected a calculus, which he proposed to remove on the morrow. After this probing the patient felt a pricking pain under the tongue, and, placing himself before a looking glass, he observed a sharp-pointed stone protruding, which by the aid of a large pin he succeeded in extracting for himself. The concretion was cone-shaped, and was formed around a fish bone.

Lusus Naturæ.—Dr. W. H. Bent, of Argyle, N. S., reports the following peculiar case of monstrosity occurring in a child whose parents reside in Pubnico. It has three legs in perfect use, two complete sets of sexual organs (male); two perfect arms, and two imperfect ones—the latter growing from the middle of the back and curving in a line with the lower ribs. The head is finely developed, and what appears to be a second one is situated half way down the left side of the neck. It is considered a great wonder among the French Acadians.—*London Medical Record.*

Methyl-bichloride.—This anæsthetic is being used at the St. John's Hospital with the best of results, and so far it seems to possess many advantages over both chloroform and ether.—*Mo. Clin. Record.*

ON THE USE OF THE CAMERA LUCIDA TO MEDICAL AND OTHER MICROSCOPISTS.

(Read before the Northumberland and Durham Medical Society).

By W. J. BARKAS, M.R.C.S.E., L.R.C.P., Lond.

THERE can be no doubt that one of the greatest stimuli to the advancement of medical science was the invention of the microscope, and I will, therefore, not waste your time by entering into any particulars as to what has been discovered by its means in pathology, medicine, &c, for you all, doubtless, are sufficiently well acquainted with that branch of medical history. Since the first microscopes were manufactured, great advances have been made in adapting other appliances to them in order to beautify the object under investigation, and to throw light upon it in different directions, such effects being produced by the parabolic reflector and the polariscope; also to enable us to project the magnified image upon a sheet of paper so that we may copy it. Other appliances have been invented and added to the microscope, but it is the last only to which I am going to direct your attention, viz., the camera lucida. There have been seven or eight varieties of camera adapted to the microscope, but only two are in common use; in one, the magnified image is reflected by means of a prism, a contrivance due to Dr. Wollaston; in the other, this is effected by an oval piece of flat glass, which may either be perfectly clear or of a bluish tint, placed at a certain angle to the rays of light proceeding from the object; this is commonly called Beale's camera. Whichever of these methods is adopted, the principle is the same, the microscope is placed horizontally, the prism or inclined glass is fitted on the eye-piece by a cap, and is so arranged that the image, after it has passed through the eye-piece, strikes upon an inclined surface and is reflected upwards at right angles, so that, on looking down through the prism or inclined glass, you perceive the image of the object lying below your eyes. In order to draw this projected image, it must fall upon a piece of white paper, when it can be traced with a pencil, provided the degree of light falling upon the paper is regulated according to the distinctness of the projected image, the darker the reflected object the less light must be allowed to illuminate the paper. All this seems very easy, but there are many more things than those I have just

mentioned to take into account if you desire to draw an exact *fac-simile* of your slide. According to Beale, one would think it the easiest thing in the world to get a piece of blue glass fitted on the eye-piece, and when your slide is properly focussed, to look down and copy it, but this is a great mistake. as any of you will discover if you try it. Let us examine Beale's camera first. Fit it on the eye-piece, and then look down through the pale blue glass, and there is the image on the piece of paper. Well, so far that is all right; but we have yet to copy it, and to do so we must see our pencil point distinctly, and see it too with the same eye that is looking at the projected image, and not with the disengaged eye, for I am positive that not one in fifty of you will draw a correct copy with the free eye, aye, even after half a year's practice. We will suppose you can now see your pencil and object at the same time, the next thing to be done is to follow your pencil as it traces the object without moving your head, for the slightest movement of the head will throw your tracing wrong, and you have also never to lose sight of your pencil marks, so now, you have to see your object, pencil, pencil marks, follow your pencil as it is moved, move your hand without shaking and very slowly, or you lose sight of your pencil, and, finally, your head has to be kept in one position till the drawing is finished. All this with Beale's camera, the very worst camera you could possibly use; of course, in this statement, Beale does not agree with me, but then what inventor will agree to anything that militates against his invention. I will give you my reasons for speaking thus unfavourably of this form of camera, and for praising the prism. The first consideration in selecting a camera is, that no more light from the object shall be absorbed that can possibly be helped during its passage from the slide to the paper, whichever method is adopted the light is the same after it passes the eye-piece, so that it is in the camera itself we have to find our differences of absorption, &c. Now, with the prism, I have heard it stated there is the greatest absorption, and I have been told so by opticians, who ought to know better; this statement is not true, for the light enters into a prism of clear glass, and is reflected at right angles from the opposite side and passes straight up to the eye, and, according to a law of optics, we see the image on the paper; so that there is

only one reflection, and as the glass is colourless, the amount of absorption will be infinitessimal. Very little light will pass straight through the prism; also no light will be reflected by the face of the prism that the rays first strike upon, because it is placed at right angles to those rays. By means of the prism, therefore, the object is transmitted to the eye, with nearly if not quite, the same distinctness as when it quitted the eye-piece, and there is, therefore, very little necessity to regulate the daylight falling upon the paper. I myself always work when the sunlight is pouring into the room, and I never use any contrivance to darken my paper. All this appears somewhat complicated, but it is really very simple, the only difficulty is to arrange the prism, but when this is once done there is no more bother about it, and should you desire to alter the position of the prism, press it or raise it and it is done. We will now turn to Beale's once more, and you will find that it is inconvenient to handle, absorbs a lot of light, cannot be arranged as you wish, and gives two images. The inclined glass is loose, you perceive, to commence with, moving on the slightest provocation, and thus necessarily necessitating you to begin afresh every time it moves. Suppose it to be perfectly fast, the light strikes upon the inclined surface, and is reflected up to the eye; so far so good; but to see your paper, you have to look through blue glass, and I hardly need tell you that an object seen through coloured glass is dimmer than one seen through clear glass. That is the first objection, but you will say why not use clear glass instead of blue; for this reason, when the light strikes the first inclined surface only part of it reaches the eye, the remainder passes into the glass, and is reflected by the other inclined surface, so that we observe two nearly equally distinct images, one intermingled with the other to such an extent that it is impossible to copy the image at all.

Now, with the blue glass, most of the light is reflected by the first surface, but still not all of it, the rest passes in and is reflected as in the clear glass, so that we have still two images, though one is fainter than the other, but both of them are dulled by being seen through a blue glass. The reflected object is, therefore, almost invisible if bright daylight is falling on your paper, and it is with difficulty that you see your pencil, it is therefore necessary to put up a screen between day-

light and your paper; directly this is done, the reflected image becomes more distinct, but never so well defined as when reflected by the prism. However, now comes the question—how are you to see your pencil at all, for the light of the projected object is not sufficient to illuminate your pencil in order to render it clearly visible to the eye, and very little daylight reaches it on account of the screen. I think you will now understand the advantage of a prism over Beale's camera, but the prism is much dearer than the other, and requires more practice in working it, as I shall show you directly; so if you want cheapness and not correctness, get Beale's, but I am certain you will very soon throw it to one side; if price is not an object, get a prism from a really good maker, and the more you use it the more you will like it. Another advantage of the prism over the flat glass is this: with the prism you can send a perfectly distinct image through it, magnified so high as 1,300 diameters, but with Beales' you cannot transmit anything like 200 diameters clearly enough to be copied. Having arrived at the decision that the prism is the better camera, the next point is to use it, and this is rather difficult, because you have to look through the prism at the object, and see your pencil at the same time and with the same eye; it is done thus: half of the pupil should look through the prism at the object, and the other half should perceive the pencil point through the empty space beyond. There can be no doubt this is rather difficult at first, but when once you have caught the knack of it, it is done mechanically; some persons catch this knack after two or three attempts, while many never do. No other way will answer. If you look through the prism with one eye, and watch your pencil with the other, I am certain your drawings will never be correct. Having now guided you in the choice of a camera, and explained the why and wherefore of my opinions, and having shown you how to use it when it is obtained, the next thing to be done is to let you compare the two kinds personally, and this you shall do after I have finished, or at the end of the meeting. I will show you some of the drawings I have made by means of the prism from pathological, fossil, zoological, and botanical specimens. I have not drawn any by Beale's method to exhibit to you, for all that I have

attempted have been failures, not resembling the object at all faithfully.

Let us now look at some of the advantages that are to be obtained by a careful and conscientious use of the camera; of course, I mean the prism camera, for I defy Beale or any one else to draw an object magnified 200 diameters by the other method correctly. All persons who study microscopical subjects ought to try and extend any knowledge they may derive from their investigations that is not known to persons whose speciality does not lie in that direction, or that is new to their co-workers. This can be done by means of papers read to a society such as this, or by the publication of papers in periodicals, &c., but whichever way is pursued, the paper will not be worth much without the exhibition of the slide or a correct drawing of it, for you will agree with me that the mere description of a microscopical object does not, as a rule, convey any distinct impression to one's mind of the object. The exhibition of the slide itself is awkward, if there are a number of persons desirous of seeing it, and even if there are only a few, a casual glance cannot impress upon one the details of the structure, &c., sufficiently well to be of any worth afterwards. Then, if the author of the paper cannot be present, and the slide be a valuable one, he will not trust it out of his hands, at least I should not; therefore, how much easier and pleasanter it would be to hand about the drawings just at the time the object was being described, and after the paper was read, they might be left in the charge of the Society, and kept in its portfolio. In this way the Society has a correct drawing of, it may be, some abnormal pathological structure, that is exceedingly curious, and, therefore, valuable, while the author retains his slide, without running the chance of any damage accruing to it through carelessness or ignorance. Again, should the author be desirous of publishing his paper with engravings of his slide, he has merely to forward the paper and the drawings, and all trouble is at an end; but if he cannot draw it himself, he must send the slide to the editor, and it is placed in the hands of an engraver, who knows nothing about what he is looking at; and I have known them actually sketch direct from the eye-piece without the use of a camera at all. I draw all the figures myself for

my papers on Fossil Teeth that are appearing in the *Monthly Review of Dental Surgery*, by means of the camera, and the engraver has merely to trace them. In order to show you how the objects are changed when drawn by an engraver ignorant of the subject, I have only to refer you to the figures of the microscopical structure of fossil teeth, given in my father's work on "Coal Measure Palæontology;" the ifigures, however, illustrating the teeth and jaws themselves are passably fair. Here are two illustrations, both intended to show the structure of a tooth of Megalichthys, one drawn by myself and the other by the lithographer. Still, holding on to my own speciality, I can point out to you frequent errors in the great work on "Fossil Fishes," by the late Professor Agassiz, the greatest palæontologist we have ever had; and I should say, from an examination of the drawings therein, that they were either done by a person ignorant of tooth structure, or that they had been drawn without the aid of a camera. Another advantage, and a very great one in my eyes is, that when a drawing has been made, one can forward it to any correspondent, and allow him thus to see what you have described to him, without risking the breakage of your slide by sending it through the post. For, although the post is a most valuable institution, the letter sorters are rather careless, and toss things about a little recklessly, and it does not take much ot a shock to damage a slide irreparably. But over and above the convenience to lecturers, authors, and correspondents, it is of inestimable value to the quiet workers at the microscope; because by means of the camera, we have a very easy method of measuring the size of an object in the field, of learning to what extent one's microscope magnifies, of ascertaining that we really do see a peculiar structure when it is present, and do not imagine it, because unless it was pretty well defined, it would be rather difficult to draw it, and finally, when an object is drawn, every part comes under one's notice in detail, and nothing, therefore, is liable to be overlooked. In order to measure the size of an object, you have merely to put a micrometer upon the stage, project it on the paper, and there lie the spaces magnified, mark a space off with your pencil, then withdraw the micrometer, and substitute the slide containing the object to be measured, mark it off on

the paper in the same way, and if it agrees with the space, then whatever the size of the space is, such is the size of the object. Now, micrometers are divided into $\frac{1}{100}$ths of an inch and $\frac{1}{1000}$ths of an inch; therefore, if the object agrees with the magnified $\frac{1}{100}$th of an inch space it must be $\frac{1}{100}$th of an inch in diameter, and if it agrees with the $\frac{1}{1000}$th of an inch, then it will be $\frac{1}{1000}$th of an inch. It is by means of the magnified spaces of the micrometer also that we ascertain the power of the microscope. Suppose the $\frac{1}{100}$th of an inch space when projected on the paper measured one inch, it is very clear that that space has been magnified 100 diameters; if it only measures one quarter of an inch, it has been increased 25 diameters, and so on. I have now placed before you as many of the advantages as the time at my disposal will permit, but before closing, allow me to advise you concerning two things: first, always place your microscope, when horizontal, exactly at the same height from the paper to be drawn upon, for if it is higher or lower, your object will be larger or smaller accordingly, the reason of this I need not trouble you with, it is self-evident. I make sure about this point by always placing the microscope upon the box containing my object glasses, &c.; the second piece of advice is, always to keep the disengaged eye open, but taking care not to use it while drawing; the reason for this is, that if the eye is shut, the contracted muscles become wearied after a few minutes, and it is disagreeable work to keep the muscles forcibly contracted, not to mention the foolish appearance a person presents when his face is thus screwed up. It is rather difficult at first to keep the eye open, and not see with it, but practice makes perfect. I can assure you that, after the feat is accomplished, all microscopical work is rendered much pleasanter. I have not troubled you by entering into the details of the other varieties of the camera, for they are a little more complicated, and so far as I know, are not a bit better than Wollaston's prism. I shall be glad to show you, at the end of the meeting, the two cameras I have dwelt upon, in order that you may compare them for yourselves. These are the drawings that I have prepared, for the purpose of pointing out to you how accurately they can be done; those others are some of the drawings for my papers on Fossil Teeth, ready to be sent

to the lithographer. I shall leave them on the table, in order that you may examine them at your leisure.*

HOW THE ACTUAL CAUTERY SHOULD BE USED.

(Science Review.)

We fear a good many professional men are completely ignorant of this. We ourselves have known men who fancied that the iron was not to be brought even to a red-heat; whereas, when rightly done, it is done with a *white-hot iron*, pain being then completely avoided. Dr. J. S. Camden makes the following remarks on this subject in the *Medical Times and Gazette*, and, as they are worthy of being recorded, we give them a place. He says:—"I see in Dr. Fayrer's work on the 'Thanatophidia of India' that the actual cautery was used unsuccessfully (which, in another place, he calls a *red-hot* iron). This is not what I was always taught and seen as actual cautery. I consulted 'Cooper's Surgical Dictionary,' edited by Lane. There it is called an iron in a state of incandescence, which is, according to Maunder, incipient white heat. Professor Symes, in his lecture, calls it a red-hot iron. I also made many inquiries of medical friends, and all spoke of it as a red-hot iron. Having twice assisted in using, and once used, actual cautery, I hope I know something on the subject. When actual cautery is to be used, the iron must be heated till it is really of a white heat, and looks almost as white as white paper. If then applied, it destroys the part instantaneously, giving no pain; but it must be removed quickly on the heat decreasing, and then another iron applied. Several irons are required for use, and a fierce fire kept up by bellows, till your object is attained; but if a red-hot iron only is used, the agony is intense, as we all know who have touched it. The first time I saw it used, on a girl of fourteen years, no pain was given, to my great astonishment; the second time, on an elderly person (both for fungus in the upper maxillary bone), her screech-

* The illustrations were fac-similes of the following objects magnified from 10 to 400 diameters:—The development of the ovum of a mackeral; trichina spiralis; crystals of urea; wing of a grasshopper; section of wood; parasite of a bee; sections of the teeth of Megalichthys Hibberti and Amphicentrum granulosum.

ing was fearful, till I told the operator his irons were not halt hot enough. He then requested me to heat them properly, which, being done, not a murmur was heard. The irons were being used only red-hot. The last time was opening four or five sinuses in a favourite horse's shoulder. He never flinched, and scarcely seemed aware of what was being done. The only thing he noticed—for he never moved—was the hissing made by the destruction of the skin. Actual cautery is painless. I would suggest using—to obtain the white heat for actual cautery—a large spirit blow-pipe."

RESUSCITATION FROM CHLOROFORM NARCOSIS.

BRITISH MEDICAL JOURNAL, AUGUST 22, 1874.

In a paper read before the Surgical Section at the annual meeting of the British Association just held in Norwich, Dr. Marion Sims gives a most graphic account of a case of uterine disease in which, chloroform having been administered for forty minutes, pulse and breathing ceased, but in which resuscitation was effected by inverting the body at Nélaton's suggestion, and this not once, but on three separate occasions, the signs of life becoming extinct as soon as the patient was raised to the horizontal position. He then proceeds to give the details of a second case, in which, having amputated the cervix uteri, the junior house surgeon, who was administering the chloroform, suddenly cried out, "The patient has stopped breathing; she has no pulse." Dr. Sims quickly inverted the body, and had it held thus; and then he shook the thorax, agitating the head laterally, so as to add an impetus to the movement of the blood, which, with the body in this vertical position, would naturally gravitate toward the brain; the jaws were held asunder, and the tongue hooked with a tenaculum and pulled forward. In a few minutes the breathing was re-established, and then the pulse returned; and soon the patient was placed again on the table in the lateral semiprone position in which all Dr. Sims's operations on the uterus are performed, and the operation was finished, but without any more of the anæsthetic. Dr. Sims believes that obstetricians may take a lesson from Nélaton's method of resuscitation, by adopting it in cases of threat-

ened death from post-partum hæmorrhage. He is not satisfied with simply placing the head low, but in addition to the means usually adopted, inverts the body, and throws what little blood there is left in it wholly to the brain. Dr. Sims has never seen a death from uterine hæmorrhage, but from recollections of the few alarming cases he has witnessed he now feels sure that recovery might have been hastened if he had known and adopted Nélaton's method of inversion. Whether death from chloroform is due to cerebral anæmia or not, it is at least safe to adopt Nélaton's method in all cases of supposed or threatened danger; but Dr. Sims thinks the safest plan is to relinquish the use of chloroform altogether, except in obstetrics. The frequent cases of death from the use of chloroform in surgical operations that have occurred amongst us, even of late, should warn us to give up this dangerous agent, if we can find another that is as efficient and at the same time free from danger. Ether fulfils the indications to a remarkable degree; but, while it is safe, it is unfortunately unpleasant to the physician and bystanders as well as to the patient. He, says Dr. Sims, who will give us an anæsthetic as pleasant to take as chloroform, and as safe as ether, will confer the greatest boon upon science and humanity.

An "Expert" gives a quantity of curious statistics regarding American dentistry in a recent number of *Old and New*. Perhaps a sour critic might remark that Americans may well be expected to "show their teeth" now and then, considering the enormous quantity of false ones they buy, and the price they pay for them. The "Expert" says that his facts and figures have been collected during an experience of 15 years in local and travelling dealings. He tells us that the average annual sale of artificial teeth in the six New England States is 340,000 sets, of which (allowing for misfits and mishaps) about 200,000 are used. In the Western States even more false teeth are bought than in the Eastern, for the reason that the people "consider false, both to be not only useful and ornamental, but as evidence that the wearer has money to invest in luxuries." The sale of sets in this division of the States, accordingly, amounts to 728,000 sets, of which about 519,000 are used. The South has taken to artificial teeth only of recent years, and buys 182,000 sets, of which (allowing for bad dentistry) about 65,000 only are used. These teeth are made in five large manufactories, besides some smaller ones, turning out, in all, about a million and a quarter sets of teeth in a year. The number of dentists in the United States exceeds 5,000, and at the lowest calculation of their receipts (only 1,000 dollars a year each), the total amount of money paid by the people annually for what the "Expert" calls "tooth in and tooth out purposes," cannot be less than five million dollars.

DENTAL PATENTS.

[*The Dental Advertiser.*]

[*Under this head we publish, as items of news, the names and claims of all patents, relating to Dentistry, issued for the quarter preceding the publication of this Journal.*]

147,025—Feb. 3, 1874.—Dental Apparatus for Obtaining the Bite.—Edgar O. Smith, Albany, Oreg.

A circular bar is held at any required point upon a cushioned bar, by means of a spring-prawl. The cushion is placed under the chin, and the two ends of the circular bar are held by adjustable straps to the head-rest of the chair.

Claim.—The combination of the circular bar, held at any required point upon the cushioned bar I, by means of the prawl F, for the purpose of taking the bite in dental operations, all as described.

147,369—Feb. 10, 1874.—Dental Plate and Tooth.—Robert E. Burlan, Perrysville, Pa.

A pin is baked in the tooth, and has twisted around it a loop of wire. The ends of this wire are extended over the surface of a second plate, which is used to strengthen the first one. Stirrup-shaped loops are also passed through this additional plate, and serve to sustain side pressure upon the teeth.

Claim.—1. The wires *b b* attached to the rivets *a a* of the blocks D D, and crossing back and forth, substantially as and for the purposes herein set forth.

2. The combination of the crossing wires *b b* and the inner supporting or palaten plate B, substantially as and for the purpose herein set forth.

3. The stirrups or front supporting-wires *d*, arranged substantially as described, and for the purposes herein set forth.

147,959—Feb. 24, 1874.—Dental Drill.—James B. Morrison, Brooklyn, assignor to Johnston Bros., New York, N. Y.

The shank of the tool is reduced in size, and carries a rectangular lug, which is flush with the shaft above the place reduced. The end of the rotating power-shaft within an enveloping sleeve is furnished with a socket of a peculiar shape, into which the shank of the tool with its lug is carried. This lug rests against either one of the two shoulders, so as to rotate to the right or left. A spring in the rear of the shank forces it always firmly against the shoulder.

Claim.—1. A drill, burr, or tool, D, provided with a shank, *e*, of lesser diameter than that portion of the tool adjacent to it, and said shank being provided with a radial lug or projection *c*, and the whole tool being constructed and adapted for use in combination with the hand-piece of a dental engine, substantially as hereinafter specified.

2. The combination with the enveloping-sleeve of the hand-piece of a

dental engine of a rotary shaft, the extreme end of which is provided with the socket *p i s* substantially as herein specified.

3. The combination of a spiral or other suitable spring, *g*, with the said tool-socket, substantially as herein specified.

4. The combination of the drill, burr, or tool D *e c*, with the rotary shaft A C, provided with the said socket, and enveloped wholly or partially by a sleeve, substantially as herein specified.

148,290—March 10, 1874.—SALIVA EJECTOR.—Joseph E. Fisk, Salem, Mass.

A Gifford ejector is attached to the ordinary service water-pipe, and connected by an elastic tube and mouth piece, to the mouth of a patient undergoing a dental operation. All the saliva is carried off into the waste pipe.

Claim.—The saliva-ejector formed by the attachment of the tapered concentric tubes and check-outlet to the water supply pipe, and the flexible tube with its mouth-piece, for insertion in the saliva, all substantially as described and shown.

CROTON-CHLORAL IN FACIAL NEURALGIA.

I am so much pleased with the speedy relief a patient of mine obtained from croton-chloral, that I am induced to send a short note of the case, thinking it may assist a little towards a knowledge of the virtue of the drug.

On February 21st, I was consulted by A. B., a married lady, aged 32, slightly anæmic, suffering occasionally from dyspepsia, and, for the last three or four years, subject to severe attacks of facial neuralgia on the right side (distinctly along the branches of the nervus trigeminus). Three weeks ago, an attack came on. The pain was most excruciating, with but little intermission, causing sleepless nights and rendering the patient almost frantic ever since the first day of this attack. She had other medical advice a week before coming to me. She had been blistered behind the ear, and had three sound teeth extracted, and tried various other means to obtain relief without avail.

I prescribed three grains of croton-chloral, to be taken every four hours until the pain was relieved. After the first dose, a modified attack was felt; after the second, a very slight attack; and after the third dose, perfect ease was experienced. I saw the patient on the 8th of this month. She has had no return of the pain, and has slept well every night since relieved.

FRANCIS B. LEE, M.R.C.P., Heckmondwicke.

DENTAL REFORM IN FRANCE.

Circular by M. Cautero.

Sir and Honoured Brother,—You have doubtless heard of the reform that certain of our brethren wish to introduce into the study and exercise of dental surgery in France. For this end the principal dentists of Paris, both French and foreigners, wish to organise a committee. This committee will elaborate a programme to be introduced to regulate the teaching of our art in order thus to lay down the basis for a law which we shall submit to the National Assembly.

This idea is honourable to those who have thus taken the initiative; its success will be honourable to ourselves, for it will tend to elevate the intellectual level of our profession by preparing the education for capable and well informed members.

In order that the end designed by our brethren may be the more easily accomplished, the concurrence of all is indispensable.

We are asked to approve of this project; I do not think I am saying too much when I affirm that nobody can be indifferent to the idea suggested. I must confine myself to what I have to say to you on this interesting study. Our journal, *Le Progrès Dentaire*, has undertaken to give all the necessary particulars, and to reply to all the objections which might be brought forward.

Intrusted by the editor to be correspondent in our region, I claim now, in his name, your concurrence and your support; I claim also your adhesion to the law project of which I have spoken. You can communicate direct with the editor. In case you should wish to make use of my mediation, I shall be happy to be at your disposition.

I am, Sir, and Honoured Brother,

Very faithfully yours,

Dental Surgeon, Bayonne. T. Cautero.

(*Le Progrès dentaire*).

Relics of the Past.—We learn from Brünn, the capital of Moravia, that some enormous skeletons of gigantic animals, presumably mammoths, have been found at a place called Bohonitz, in the environs of the city. The class to which the animals belong is determined by the discovery of a tooth of the mammoth similar to one found in the same neighbourhood in 1795, and preserved in the museum of Brünn.

DENTAL REFORM IN GERMANY.

(Deutsche Vierteljahrsschrift).

In the early part of the year the dentists in Berlin forwarded a petition to His Excellency the Minister for religious and medical education, Dr. Falk, for the restriction of quackery in dental surgery.

The petition is too long to reprint here, but a proposal is made in it to describe all those persons without diploma, occupied with mechanical work, as "dental artificers," in distinction to qualified dental surgeons, whose position, both professionally and socially, such persons greatly injure, as well as shamefully deceive the public, on whose gullibility they trade. This petition was signed by a large number of Berlin dentists to begin with, the names being now greatly augmented by the best provincial men.

An answer was received from His Excellency, who has communicated with the Imperial Chancellor on the subject, as the subject of the petition touched the Trades Regulations of the 21st of June, 1869.

Our German brethren seem quite satisfied so far, with the result of the petition, knowing that an immediate change could not be effected, and congratulate themselves that though little has been accomplished with the first petition, that little is the forwarding of the petitition to His Excellency the Imperial Chancellor.

The following revised tariff has been drawn up by the Berlin Dental Association:—

Dental Fees.

The fixed tariff for dental services is not suited to the conditions at present existing. The claims applied for by dentists have become quite different, and the operations described in the old tariff, some of which we only know by name, have been replaced by other and better ones. In the old tariff operations are described which are no longer performed, whilst the later methods of operation are not mentioned at all.

We are now endeavouring to adjust the tariff to the present claims and services, and to raise the fees in proportion. We shall bring this important business before the dental association.

The payment of qualified men is, according to No. 80 of the Trades Regulations, left to contract; if no contract

has been agreed upon, we propose the following terms shall be the value:—

		s.	
1	For extracting a tooth at the Dentist's house	3	15
2	Should this or any other operation take place at the patient's house in addition to the usual fee, will be paid	3	10
3	For extracting a fang	3	15
4	When more fangs are extracted at the same time, for every succeeding one	2	10
5	For extracting a tooth, with resection of the alveolus ...	5	20
6	For destroying the pulp	3	10
7	For removing the pulp	3	10
8	For first treatment of a sensitive tooth	3	10
9	For each following	2	5
10	For drilling a tooth as far as the pulp canal	3	10
11	For drilling a fang, in order to fasten an artificial tooth ...	3	10
12	For scaling the teeth	10	30
13	For filing a sharp tooth	3	5
14	For every succeeding tooth	2	5
15	If cutting and polishing be at the same time necessary, extra	2	5
16	For the removal of the resp. filings from a carious tooth ...	3	5
17	When the same process is required for several other teeth, for each succeeding one	2	10
18	For filing apart neighbouring teeth for the better stopping carious cavities, for each gap	3	5
19	When the filing apart takes place in order to remove small carious places, for every gap	5	10
20	For the necessary smoothing and polishing, for every tooth	3	5
21	For scarification of the gums	3	10
22	For slight operations on the gums	3	10
23	First visit in illness	6	15
24	For every following one	3	10
25	For first examination and advice in the Dentist's house ...	3	10
26	If the examination embraces the whole mouth, in order to establish the seat of suffering hitherto undiscovered ...	10	30
27	For mixed stopping in carious teeth	3	10
28	For the careful removal of caries from a cavity, to be filled with permanent stopping	3	20
29	For cement or amalgam stopping	3	10
30	For tin stopping	10	20

			s.
31	For gold stopping	10	30
32	For a plate for irregularly placed teeth	30	150
	When several plates are necessary after the first plate, the succeeding ones are reckoned at the same or higher, according to the amount of new work		
33	If the plate is for several teeth, a higher fee will be charged for each tooth, from	10	20
34	Should the directing such a tooth not require an especial plate	10	20
35	For every visit, including the necessary little alterations which may be required either in a plate or band	3	10
36	For a single artificial tooth	10	50
37	For a plate with three artificial teeth	30	50
38	In metal work the fees will be doubled		
39	For making a plate with more than three teeth, per tooth ...	10	15
40	For making a plate with enamel gum the fee will be half as much again		
41	For making an entire set of teeth, with or without springs, exclusive of the metal work necessary for the same, every tooth will be charged from	10	15
42	A set of teeth embracing both jaws, will be reckoned as an entire set, the lowest charge for the same being ...	0	150
43	For an obturator	75	250
	Teeth placed on an obturator according to the rules above		
44	Instruments necessary for the treatment of fractures of the jaws, or for remedying defects of the jaw, will be reckoned according to § 32, n. 35.		

THE BERLIN DENTAL ASSOCIATION.

ARECA NUT.

(CHEMIST AND DRUGGIST.)

AS it seems that Areca Nut is likely to come in for official recognition, and as there has been a question raised as to its method of action, mechanical or therapeutic, the following note, contributed by Mr. Charles Andrews, M.P.S., to the *Pharmaceutical Journal* is useful. Mr. Andrews states his experience of its use in India, acquired during a residence in the Bombay Presidency, where he has frequently known it used by the natives with very good effect as an anthelmintic.

The natives pick it off the tree, and *grate* it on an ordinary nutmeg grater. About a teaspoonful is administered, after the patient has fasted 12 to 14 hours, either made up into a bolus with ghee (clarified butter) or floating on milk, the latter being the favourite method. It generally acts (without any other medicine being given) in about an hour after administration, and is efficacious for round as well as tape worms. It is used both for the human subject and dogs in the same manner and dose.

His opinion is that it is much more useful given *grated* than in *fine* powder. A celebrated "dog powder," largely sold, he believes to consist of nothing but this areca nut powder.

ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

THE first meeting of the Session was held at the Dental Hospital, Leicester Square, on Monday evening, 2nd instant. C. VASEY, Esq., in the chair.

The minutes of the previous meeting having been read and confirmed—

THE CHAIRMAN said he regretted being obliged to fulfil the duties of chairman in consequence of the indisposition of the President, who, he was glad to say, was recovering. He also referred to the absence of the Vice-President, Mr. Coleman, through indisposition, and regretted that there were not very strong hopes held out of his speedy recovery. After expressing a hope that the members had enjoyed themselves during the recess, the Chairman intimated that there was no special paper, and that the evening would be devoted to casual communications.

Mr. CHARLES JAMES FOX made a communication with reference to a case of fractured jaw, which had been successfully treated by the use of Mr. Moon's new splint.

THE CHAIRMAN said he had seen a few cases of fracture of the lower jaw, but he did not remember seeing one that united perfectly.

Mr. MOON exhibited some models of cases of fractured jaw which had been treated at Guy's Hospital on different plans. The splint Mr. Fox had introduced to the notice of the meeting, ought not, he said, to bear his (Mr. Moon's) name, as it had been introduced by Mr. Millikin, the instru-

ment maker at Guy's. It had been found that its effects were exceedingly valuable where the tendency to separation was very strong. The screw action on either side regulated the splint, so that the fragments could be brought into position by a very gradual screw movement. He was glad to bring before the notice of the meeting a new wire splint, devised by Mr. Hammond, which was rather difficult to apply, but was particularly comfortable for the patient to wear. He had another model, which might be called a modification of Gunning's splint. A cap was made for the fractured jaw, which was kept in place by a wedge-shaped cap; then the band being applied, kept the splint on the fractured jaw as well as if the whole mouth were filled with one interdental splint. In this case there was more room for the introduction of food, and it was very much easier to apply. Another model represented the first case treated at Guy's, with Mr. Hammond's splint. The jaw was fractured in three places. Two fractures were covered in with the splint, and united perfectly; the third, which was overlooked, did not unite, and pus formed. After wearing the external splint to keep it in position for some time, it was removed, and the cap was kept on by the wires passed round through the splint, and encircling the teeth on either side. That plan answered very well, though there was a tendency for the splint to cut the wires, unless it was very carefully done.

Mr. Francis Mason asked whether the time occupied in effecting a cure by Mr. Moon's method was less than that required for any other method of treatment. He treated the case of a woman in St. Thomas's Hospital, who had thrown herself from a window, and had sustained a compound fracture of the jaw and a fracture of the sternum. There was immense distortion of the lower jaw. Nothing was used except the ordinary four-tailed bandage; there was no splint used whatever; and, although the accident happened only five weeks ago, the patient was now quite well. Another patient, twenty-two years of age, whom he saw three years ago at Hounslow, and who, in falling down in an epileptic fit, had broken his jaw in two places; in four or five weeks afterwards perfectly recovered under the same treatment. He would ask Mr. Moon if there was any gain by the application of the instrument, and whether,

while wearing it, the patient was prevented from eating or not.

Mr. CHARLES JAMES FOX said he candidly confessed that he had had very little experience in cases of fractured jaw. That was only the second case that had fallen to his lot to treat, and the extreme facility and ease with which the fragments were passed up into the frame struck him very forcibly. He had received an application from the House Surgeon of one of the principal hospitals, to attend and adjust a similar case with this splint, but he referred him to Mr. Moon himself.

Mr. MOON again disclaimed its being his method at all. The apparatus that had gone by his name, had simply one method of fixing on a cap. There were three or four other methods, each of which might be the best in a particular case.

Mr. TURNER said that in the case of gun-shot wounds, he had found that after the contraction of the muscles of the lower jaw had ceased, the parts could be brought into position, and the cases treated as successfully without splints as with them. He did not think the interdental splints had served much in the way of getting the jaw into position. He thought that a mistake was sometimes made in keeping the lower and the upper jaw apart too long. If the gags of wood or cork were taken away sooner, there might be better results. He had used a splint which was made to fit the upper jaw with the surface adapted to the teeth of the lower jaw, and which was about the most easily applied interdental splint he had ever seen.

Mr. MOON said that in reference to the remark made by Mr. Turner, that there was no difficulty in reducing the fracture; he might state that in the case mentioned by him, there were three fractures of the lower jaw, and no amount of hand pressure would force up the anterior portion. The patient was put under chloroform, but even then it could not be done with the splint and screws. With regard to the jaws uniting without any appliance to keep them steady, he was asked to look at a case at Guy's Hospital, which he was told had been doing uncommonly well. It had been treated with the best of gutta-percha round the back teeth, and with the four-tailed bandage. Wires had also been put round the teeth on either side of the fracture—a most abominable plan—because part of the

socket of the teeth being already lost, the wires which were put round the teeth pulled them out of their sockets. Within five weeks the wire broke, not the slightest union had taken place, and the displacement was very great. He might mention that that case was to be treated to-morrow morning in the Surgery at Guy's. Hammond's wire splint was to be used, and he had no doubt, that even after the five weeks displacement, there would be a certainty of union.

Mr. FRANCIS MASON said that when he was Assistant Surgeon at the Westminster Hospital in 1868, a patient, aged twenty-two, applied to him with a swelling of the left side of the lower lip. He had fallen from a scaffolding two months previously, and had sustained a fracture of the lower jaw. He had been treated elsewhere, and was subject to fits. A puncture was made in the swelling, when a portion of the crown of a left lateral incisor of the lower jaw was extracted. The patient had missed it after the accident. It was decayed at the neck, and had sharp edges. After its extraction, the patient was only under observation for a few days, and soon recovered. He cited from the Medical Journals several similar cases where foreign bodies seated in wounds in the lips or cheek had given rise to great nervous disturbances.

Mr. TURNER mentioned the case of a patient, a commercial traveller, about 60 years of age. Underneath the tissue at the root of his tongue was found the bar of the lower plate which had carried the spiral springs of a set of teeth. The patient had been treated for phthisis and cancer; he was greatly emaciated and could not speak, and his mouth was in the most offensive state possible. In a few days after the removal of the plate, the man was able to feed and to come out of the hospital, and he recovered his voice.

THE CHAIRMAN said he had known one or two cases of a similar kind but they had generally been noticed long before they set up the mischief described in Mr. Turner's case.

Mr. OAKLEY COLES then made a communication illustrating the treatment of certain deformities of the mouth. The cases he cited were, he said, of some interest pathologically, since he believed loss of tissue at the fore part of the mouth from syphilis was comparatively rare when they were taken in comparison with those of per-

foration of the soft parts or loss of tissue in the posterior part of the hard palate. In both cases a large portion of the anterior part of the maxilla was lost through tertiary syphilis. In one case the lower jaw was not affected at all, and in the other, in which no piece was shown, the lower jaw was affected—a very unusual circumstance. The method adopted was simply to cover the portion of the palate that remained, taking advantage of the overlap [that freely communicated between the upper margin of the portion of the palate that remained and the floor of the nose,] using the overlapping to get some fixture. By this means the patient was able to speak and to feed himself fairly well. The piece exhibited he had not been so successful in, as in the first which was made light by carefully carving out a piece of pumice stone to fit into the bed of the palate, which being covered all over with vulcanite was materially lightened, thus reducing the discomfort of having a heavy piece in the mouth.

Mr. SEWELL made a communication on the use of absolute alcohol in dental operations. The first use of absolute alcohol was for drying purposes. He had tried it in his practice and found it very useful in thoroughly drying the cavaties before the insertion of fillings. Another quality which would make it still more valuable in dental operations was its antiseptic properties. It would be very valuable in such operations as extracting nerve pulps and filling fangs. In these cases, by the use of absolute alcohol and oxy-chloride of zinc fillings, there had been much greater success than by the old method of dealing with fang fillings. Mr. Sewell then read a contribution on the same subject by Mr. Fletcher, who advocated the use of chloroform and the lining of cavities with varnish.

Mr. COLES testified from his own personal experience to the value of the suggestion of Mr. Sewell as to the use of absolute alcohol. It was especially useful in those cases where there was a large cavity with a mass of softened dentine exquisitely sensitive to the touch of the excavator. He recommended it to those who had not yet tried it with very great confidence.

Mr. TOMES said he had generally used sal volatile for the same purpose. It did not so much assist in drying the tooth as it almost at once hardened the dentine and caused it to become brown.

Mr. TURNER felt greatly indebted to Mr. Sewell for his suggestion. He had never been able to get a cavity so clean looking or so satisfactory in every way as he had been since he used absolute alcohol.

Mr. SEWELL, in reply to Mr. Fletcher's remarks, thought it was less effectual to wipe a wet surface with chloroform than with dry cotton wool, as chloroform had no affinity for water. As to the lining of varnish applied to cavities, he (Mr. Sewell) thought that any varnish that could be applied would be liable to decomposition. In reference to Mr. Coles' kind remarks on the subject of sensitive dentine, he might say that spirit had always been used for drying the sensitive dentine, which he thought could be accounted for by the action of the absolute alcohol on the contents of the dentinal tubes, which were the seat of sensation and were capable of being acted upon by spirit. They could be de-vitalized, and shrivelled up, and dried on the surface by the absolute alcohol, and therefore in this way the sensitive dentine could be cured. The property of sal-volatile turning softened dentine brown, mentioned by Mr. Tomes, was also manifested by absolute alcohol, which, he might add, was a common article of commerce and could be had of all druggists.

Mr. RANGER made a communication on unusual injuries of the teeth. The first was a boy, nine years of age, who came to St. Thomas's Hospital in March, 1871, complaining of pain in the central incisor tooth. On being removed a brass pin was found projecting about half-an-inch from the apex of the fang, having been forced up the pulp cavity by means of a piece of wood and the point of a slate pencil. The other case was one of dilaceration. The patient was a girl, nine years of age. The tooth was bent completely at right angles, and there was a good deal of enamel round the seat of the injury. The fang was very fairly formed, but it jutted out at the posterior extremity in rather a remarkable manner, and seemed to stand away from the remaining portion of the teeth. The pulp cavity was continuous from the fang to the cusp. The other case of inter-alveolar fracture was somewhat similar. He thought the cases were somewhat rare, as they had been the only ones met with in St. Thomas's during the last ten years.

Mr. G. HENRY related an incident which happened to

himself. After removing a little tartar from below his lower teeth, a considerable irritation ensued at the neck of the tooth, which spread to the corresponding portion of the apex of the fang. It pointed and matter was discharged. Two or three days afterwards a little hard point worked out of the gum, which proved to be a very small portion of the alveolus which, in removing the tartar, had been chipped off. This showed how a foreign substance could set up considerable irritation.

The meeting was then adjourned to the first Monday in December, when a paper would be read by Dr. Rottenstein, of Paris, on Dentifrices.

AMERICAN DENTAL SOCIETY OF EUROPE.

(*The American Register*, *July* 11, 1872).

On the Wednesday, Thursday, and Friday of last week the above Society held its second annual meeting in Geneva. After the usual address, delivered by the President, Dr. C. Terry, of Zurich, and an address of welcome by Dr. George W. Field, of Geneva, the Society proceeded to the admission of new members. No dentist is eligible for membership except he be introduced and vouched for by three members of the Society, in good and regular standing, after which the candidate must pass a satisfactory examination before the Committee on Membership.

The following dentists were admitted as members:—Drs. Abbot, Dumont and Paige, of Berlin; Drs. Kingsley and Crane, of Paris; Dr. Wasson, of Rome; Dr. Gregory, of Lyons; Dr. Skelley, of Geneva.

Other applications were made, but were laid over till next session.

On the Thursday the following subjects for discussion were taken up, and the remainder of the Session was occupied in their consideration and in the reading of essays on the same.

Pivot teeth.
Local peculiarities and diseases of the teeth in different parts of Europe.
What does experience teach to be the best material for filling teeth.
Causes that underlie the decay and loss of teeth.
Diseases of the antrum and treatment.
Operations hurriedly made and their opposites.

The essayists were Drs. Field, Wasson, Wright, Van Marter, Williams, and Terry.

This Society has for its object the discussion of such subjects as are of interest and importance to the intelligent and progressive practitioner of this speciality of medicine and surgery; and to establish the dental profession in Europe in the same grade of a liberal and learned profession which it holds in the United States. The next session will be held in Hambourg on the first Monday of August, 1875.

DEATH FROM CHLOROFORM.

(Lancet.)

An inquest was held last week at Addenbrooke's Hospital, Cambridge, concerning the death of a patient who had died in that institution while under the influence of chloroform. From the evidence of Professor Humphry, who was called as a witness, it appears that the patient was suffering from dislocation of the humerus. His age was forty-seven, but he appeared to be sixty, and when he first sought advice at the hospital he was slightly under the influence of drink. When informed that chloroform would probably have to be administered to him, he expressed some unwillingness to take it. One unsuccessful attempt at reduction was made without chloroform, and then (with the patient's consent) chloroform was administered. The heart's action, as ascertained by previous auscultation, was found to be weak, and great caution was therefore exercised during the administration of the anæsthetic. "The quantity of chloroform given was very small. The patient soon began to struggle, and the chloroform was immediately discontinued. After the struggling had ceased, the appearances were such as to cause alarm, and active measures were promptly taken to restore him by artificial respiration, electricity, and other means. These were continued for nearly an hour, but with no avail." The post-mortem examination revealed nothing. The heart presented no appearance of disease.

This is the second death from chloroform within a short time at Addenbrooke's Hospital—a fact, as the coroner very sensibly remarked, much to be regretted, "because it might excite some distrust as to chloroform in the minds of persons who did not reflect how very small was the

proportion of the cases in which accidents occurred from it, to those in which it was used with the greatest benefit." This adds another to the numerous class of fatal cases in which death succeeds immediately to severe struggling. We have often had occasion to point out that the period of struggling is always a critical time in chloroform narcosis. It may be that the act of struggling puts too severe a tax upon a heart whose action is already weakened by chloroform, or it may be that the condition of muscular rigidity which often accompanies the struggling overtaxes the heart by producing a slight amount of apnœa by the rigidity of the chest-walls. Whatever may be the exact explanation, the undoubted fact remains. We do not gather from the report before us what was the method of administration employed.

LONDON DENTAL HOSPITAL.

CASES TREATED FROM OCTOBER 1ST TO OCTOBER 31ST, 1874.

Extractions. Children under 14	381
Adults	407
Under Nitrous Oxide	213
Gold Stoppings	121
White Foil ditto	51
Plastic ditto	144
Irregularities of the Teeth treated surgically and mechanically	21
Miscellaneous Cases	252
Advice Cases	51
Total	1641

DAVID HEPBURN, *House Surgeon.*

TO CORRESPONDENTS.

ALL communications intended for the Editor should be addressed to the care of Messrs. SMITH, ELDER & Co., 15, Waterloo Place, Pall Mall.

All inquiries respecting Advertisements and Subscriptions should be sent to Mr. GEORGE BUTCHER, 4, Crane Court, Fleet Street, E.C.

THE MONTHLY REVIEW
OF
DENTAL SURGERY.

No. VII. DECEMBER, 1874. Vol. III.

THE "DENTAL REGISTER" ON LACTO-PHOSPHATE OF LIME.

Some experiments have been made during the past ten or twelve months with lacto-phosphate of lime, and lactic acid and phosphate of lime, for the treatment of exposed and diseased pulps of teeth; and so satisfactory have been the results, that some further notice of it seems now to be called for, and many enquiries are made as to the cases in which it is applicable, and the method of using it.

We have been using it since March last, and have been much pleased with its operation in most cases in which there was any hope at all.

The following is an illustration of many cases in our experience :—

Mr. B. presented the first right superior molar much decayed on the posterior proximal, involving the posterior lingual surface. The tooth had been painful for several days. Removed the debris and decay, when a large cavity was shown with rather a large pulp exposure. It was washed out, dried, and a paste of lactic acid and phosphate of lime, of proper consistence, was applied, and the cavity filled with a hard adhesive wax. The patient at once remarked that the tooth felt better than for days past; in fact, there was no pain or uneasiness. At the end of three days it was removed, cleaned out, examined, and presented a good appearance. A second application was made, which remained a day or two with the same result; then this was removed, and for a test carbolic acid was applied. Pain immediately occurred and continued, though not very severe, for twenty-four hours, when it was removed, and the lactic acid and phosphate of lime applied with at once an entire cessation of pain, the patient remarking, "Now, that feels all right." This remained several days; it was then removed and another application of the same made, and the cavity filled with Guillois' cement; and from that time to this, about five months, the tooth has been as free from any unfavorable

symptoms as though it had never been decayed or diseased. The pulp is evidently living.

This is a fair example of many cases. So encouraging has this treatment been in our hands, that we have no hesitancy in advising all to try it.

The Lacto-phosphate as it has been prepared, readily decomposes, when it is unfit for use, so we prefer to keep the lactic acid and phosphate of lime separate, and mix them at the time of using.

We shall be greatly gratified on several accounts if this proves to be a valuable and efficient agent in the treatment of exposed pulps, with a view to their preservation and restoration to normal function.

THE MONTH.

The President of the Odontological Society.

We are glad to hear that Mr. Edwin Sercombe has so far recovered from his recent indisposition that there is every prospect of his being able to take the chair, and deliver the usual valedictory address at the next meeting of the Odontological Society.

The National Dental Hospital.

The recent performance of the Whittington Dramatic Club has realized, clear of all expenses, between £30 and £40 for the funds of the hospital. We are glad to hear of this help, for it is quite clear that London, with a population of nearly four millions of people, can well support two Dental Hospitals. The only misfortune is that they are comparatively so close together.

The Royal Society.

At a meeting of the Royal Society, held on Thursday, the 10th inst., two papers were read by Mr. Charles S. Tomes, M.A., one on the "Development of the teeth of the Newt, Frog, and certain Lizards;" and the second on "The structure and development of the teeth of the Ophidia."

An Eccentric Patient.

A lunatic from the [illegible] retreat, who was taken out to have a tooth drawn, [illegible] all that he insisted upon having the rest [illegible] and it took half a dozen policemen to get him back [illegible]

Toothache Cured by Electricity.

Dr. Bouchard, of Paris, says that toothache may be almost instantly arrested by a constant battery current from ten cells. The positive pole is placed against the jaw, on a level with the painful tooth, and the negative pole to the antero-lateral region, on the same side of the neck.

London Dental Hospital.

Mr. David Hepburn, L.D.S.,R.C.S., has been unanimously elected Dental House-Surgeon to the London Dental Hospital.

Dental Surgeons and Medical Committees.

At the following hospitals the Dental Surgeon has a seat at the Medical Committee, namely:—At Middlesex, the London, St. Mary's, Westminster, University, and King's College, whilst at Guy's, St. Thomas's, and Charing Cross they do not possess this privilege. At St. George's Mr. Vasey declined the honour; and at St. Bartholomew's, where there are two Committees, Mr. Coleman has a seat on the Staff Committee. At the Brompton Hospital, Mr. Howard Hayward resigned his appointment as Dental Surgeon in consequence of the seat being refused.

Our American Cousins.

Our American friends have a way of making themselves thoroughly understood in matters journalistic that seems somewhat strange to us in this country, though doubtless "the end justifies the means," in the estimation of the promoters of the *Pennsylvania Journal of Dental Science*. The following paragraph appears on the last page in the current number of our contemporary:—

Three Things to be Remembered.

The Dental profession will please *remember*—

1. That it is an expensive job to run a journal, and that a generous support is the only way to make such an enterprise useful.
2. It is not "good practice" to *neglect bills* which are sent either for subscription or advertisements.
3. That it is *doubtful ethics* to return a bill, or to refuse a journal when the bill for subscription is sent, after having received and read it from six to nine months without protest or dissent, or even thanking the editor for generously furnishing so much first-class reading matter, on the legal supposition that when there is no return after sending the first number, a subscriber is secured.

Progress in Dental Surgery!

At the late meeting of the Southern (American) Dental Association,

in the course of a discussion on "Irregularities of the teeth," Dr. Chase said "It required more than ordinary courage to tell a patient that it is necessary to lose three or four sound teeth in order to save the others and get them regular. It would be better as a rule for all persons to have at the age of thirteen years four bicuspid teeth extracted without regard to decay. The teeth would then be better at twenty-five." We quite agree with Dr. Chase that it would require "more than ordinary courage" to suggest his plan of treatment to a patient. We even go so far as to think that it would require "more than ordinary" foresight to see the advantage likely to accrue from his proposed mode of practice, if applied to even a majority of cases, apart from adopting it "as a rule." Extracting four sound bicuspid teeth at thirteen years of age, in anticipation of the patient's dental condition at five-and-twenty, seems not so much "taking time by the forelock" as "taking time by the forceps."

NEW INVENTIONS, APPLIANCES, AND REMEDIES.

Ash and Son's Pink Rubbers.

We have much pleasure in calling attention to Messrs. Ash and Son's new Pink Rubbers. The specimens we have used have proved very successful. These rubbers are dense in structure; not so liable to "flake" as the pink rubber formerly manufactured by this firm; and so far as time will admit of our forming a sound judgment, the new material is not so apt as the old pink to become roughened on the surface after being worn in the mouth. The fact of the intensity of the colour being quite under control is a great advantage. Messrs. Ash have devoted much time and attention to the perfecting of their dental rubbers, and we feel they may be congratulated on the results they have now obtained.

Phenate of Soda.—Solution.

This may be used as a wash for the mouth, and for preventing tenderness after the extraction of teeth. Use one part diluted with twenty parts of water. It is prepared by James Woolley, Sons, and Co., Manchester, and sold by their London agents, Messrs. Smale Bros.

New Atmospheric Attachment to Dental Plates.

Patented by I. P. Gillespie, D.D.S., and manufactured by Messrs. Hall & Gillespie, and sold by G. W. Rutterford, at "The American Dental Depôt," 11, Poland Street, London, W.

This invention consists of a flexible disk of pure India rubber, fastened to the plate with a rivet in the centre, a collet of gold is then placed upon the upper side of the disk of suitable size, and a rivet is passed through the collet, disk, and plate, and rivetted down firmly, so as to cup or hollow the disk in the centre; when it is applied to other than metal plates, a small collet or washer is used on the lower surface of the plate, to prevent the rivet from drawing or injuring it.

The disk can be applied to old plates as well as new. The chamber to receive the disk should be made larger than the diameter of it (the disk) to allow its edges free play, and the disk should always protrude a little, so that it can slightly imbed itself in the roof of the mouth.

The disk should always be placed in the most level part of the arch. By this improvement a plate can be secured in the most difficult mouth, and is beneficial in every case. With the aid of the above directions for its application, a little experience will enable anyone to apply it successfully.

We have carefully tested this simple but ingenious appliance in practice, and can speak most highly of its success.

Dental Floss Holders.

This is an instrument for holding and using silk floss for cleansing between the teeth. It renders this hitherto difficult, and unpleasant process, an easy one, and in no respect is it more objectionable than the tooth-pick, and it accomplishes a work that the ordinary pick cannot do. It contains from six to ten yards of floss, and is of such form as to be carried in the pocket with as little inconvenience as an ordinary tooth-pick. They are manufactured by Codman and Shurteleff, of Boston, and we presume can be obtained at any of the *Depôts*.

A New Hand Piece.

We are using upon the Morrison engine a new hand-piece that in one respect is superior to any we have used before: viz., the ease with which the burrs and drills are fastened in it, and the firmness with which they are held; this is done by the retaining point for the drill being slit longitudinally from the end, the drill placed in the holder is made firm in place by a sliding band or ring being drawn tightly on to the point. This instrument was designed and constructed by Drs. Evans & Edson, of Toledo, O.—*Dental Register, November.*

To Arrest Hemorrhage of the Mouth and Gums.

Take fine flour, a sufficient quantity, and work into it balsam of fir to the consistence of thin smooth dough. Then take equal parts of powdered kino and catechu, a sufficient quantity, and work it into the dough until it is quite stiff. Roll into masses as large as convenient for introducing into the mouth, and use as many as are necessary to pack the mouth tightly when the patient's mouth is closed, so that every part from which hemorrhage issues may be closely compressed by the medicated mass, to get the mechanical as well as chemical effect of the remedy. Renew the application as often as the mass becomes softened by the saliva so as to render it ineffectual.

We have used this remedy in the way just described in a number of cases, with complete success, after persulphate and pernitrate of iron, and other more or less vaunted styptics, had failed to serve any good purposes.—*Pacific Medical and Surgical Journal.* Q. C. Smith, M.D.
Cloverdale, Cal.

Jarvis' Separators.

By the use of these instruments, without delay to the operator or appre-

ciable pain to the patient, adjacent teeth may be forced apart for any of the various purposes for which it has been customary to wedge teeth. Crowded teeth can be parted, so that rubber dam can be applied without difficulty or loss of time.

The Separator consists of a piece of steel, nickel-plated, bent upon itself, having the two ends formed to fit the outer portions of the proximate surfaces of two adjoining crowns.

These jaws are forced apart by the action of a screw, which passes through one and against the other of them. This form is applicable to all the bicuspids and molars. It does not touch the gums or injure the teeth, neither does it cause pain sufficient to be of consequence. The whole instrument is drawn to a spring temper. The jaws are thin, in order to be out of the way, and also the more perfectly to adapt themselves to the surfaces of the crowns of the teeth than if they were rigid. The appliance may be left on, in many cases, while operating, or if removed, the space gained by its use may be retained by inserting a wooden wedge.

The Compound Wedge consists of two wedges approaching or passing each other. This is especially applicable to the incisor teeth, and will be found useful in making room for passing rubber dam around crowded teeth. In use, a small strip of wood should be placed over the teeth and beneath the cross-bar, to prevent the points from sliding towards the gum.

These instruments are made by Johnston Brothers, of New York.

INSTRUMENTS INTRODUCED BY MR. GREENFIELD, SEPTEMBER, 1874.

MANUFACTURED BY MESSRS. ASH.

No.'s 1 and 2 are intended to supply a want universally experienced, being specially designed to supercede the file in reducing fillings on proximal surfaces without lacerating the gum. No. 1 can also be used for scaling.

No.'s 3, 4, 5 and 6, are right and left-sided chisels, whose appearance bespeaks their peculiar utility.

No.'s 7 and 8 are designed for scaling and removing decay from proximal cavities, 9 and 10 are used for the latter purpose.

No.'s 11, 12, 13, 14, 15 and 16, are generally useful, and can be beneficially employed according to the fancy of the operator.

All of the above are adaptations of instruments originally designed by D. Corydon Palmer, of New York, and Dr. Buttler, of Cleveland, Ohio, U.S.G.

We have had these instruments in use ourselves and find them most serviceable in form.

We are compelled to hold over notice of a number of other Appliances that we have received, on account of the pressure on our space this month.

Fig I.

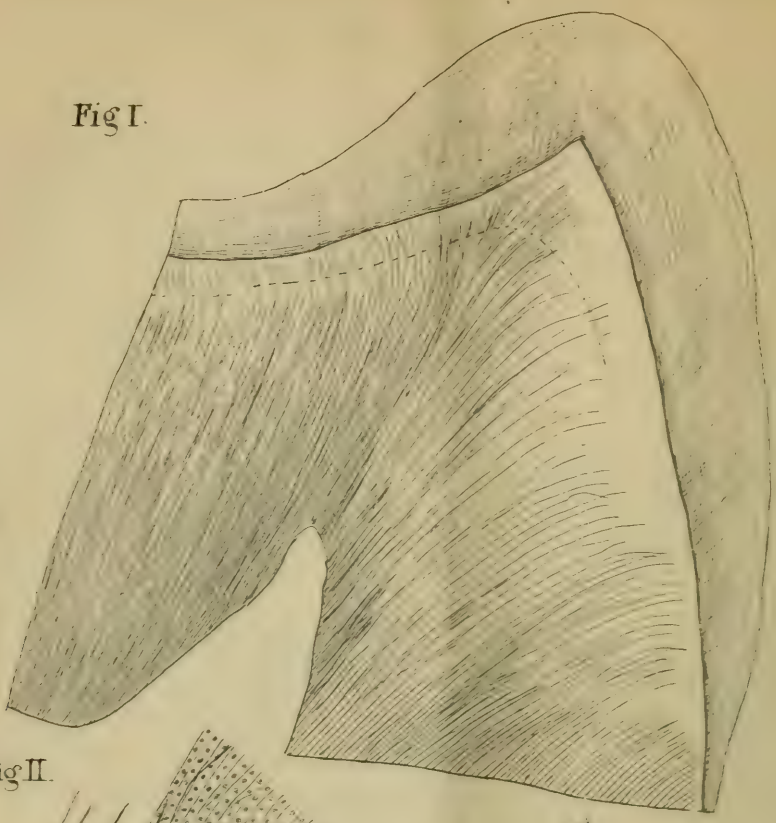


Fig II.

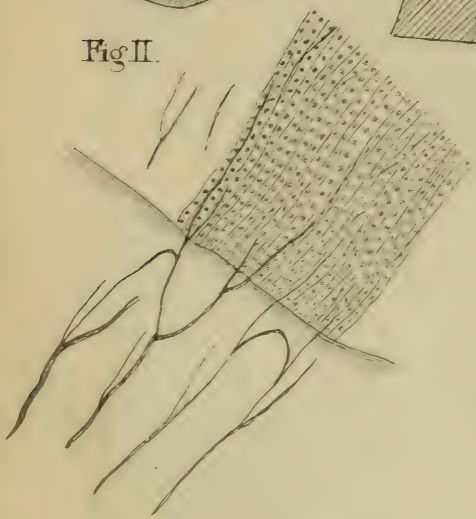


Fig IV.



Fig III.

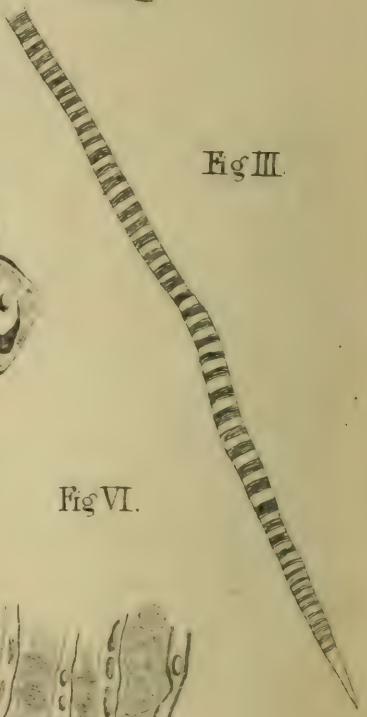


Fig V.

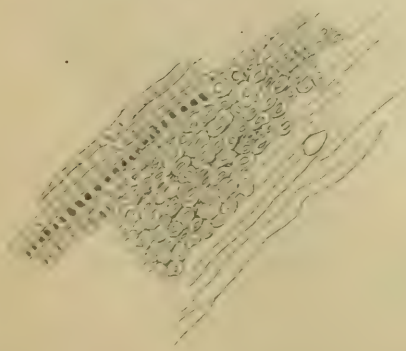
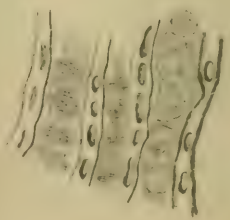


Fig VI.



T. Bessent, Lith. 22 Essex St. Strand.

ON A CARIOUS TOOTH.

By W. J. BARKAS, M.R.C.S.E., L.R.C.P., Lond.

Part I.

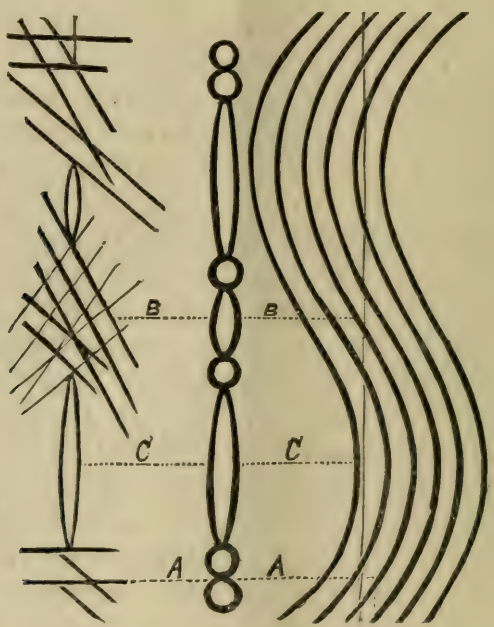
STRUCTURE OF THE HEALTHY TISSUES.

ENAMEL.

The essential character of every tooth, whether Mammalian, reptilian, or piscine, whether recent or fossil, is that it shall be formed of dentine, moulded so as to enclose a pulp cavity, but in the human tooth we have, over and above the pulp cavity with its wall of dentine, two other coverings, viz., one of enamel and one of cementum, both of which are situated externally to the dentine, but in totally different parts of the tooth; the enamel covers only that part that is exserted when the tooth is in situ in the jaw (of course I am now speaking of a perfectly matured tooth), the cementum forms a coat over that portion that is buried in the bony substance of the alveolar process. In making a vertical section, therefore, of the crown of a tooth, we find that there are two coverings to the pulp cavity at that place, one, comparatively thick, of dentine, the other, comparatively thin, of enamel. Fig. I. is a drawing I have made from a vertical section of the masticating surface of a healthy molar, by means of the camera lucida, in order to shew the relative thicknesses of these structures, and their position to each other. A similar section of the fang exhibits an internal layer of dentine, and an external one of cementum, but as these papers are merely intended to illustrate those forms of decay that attack the enamel and dentine of the crown, I shall say nothing further with regard to the structure of the roots. It must not be understood, however, that decay never does commence in the cementum, for it does occur there, but rather unfrequently. At some future time I may deal more especially with this form of caries of the teeth. Before I can describe the advances made into the enamel and dentine by caries, it will be necessary that I should first enter minutely, but yet as briefly as possible, into the minute structure of a healthy tooth. But be as brief as I may, I find that it will occupy too much space to describe both the healthy structures and the changes they undergo in caries, in one paper, I therefore intend to speak now of the researches of others

and the results of my own investigations into the healthy structures, and after that we shall be better able to understand the character of the changes in those tissues when affected by disease. Whenever decay breaks out in the crown of a tooth it is a sure sign that the enamel is the tissue primarily at fault, I shall therefore describe, now, the histological characters of the enamel, and in future papers I shall speak of those of the dentine, and finally of the changes produced in those tissues by caries.

The enamel is generally supposed to be composed of a series of tubules running from the dentine directly to the periphery, each fibre or tubule being hexagonal in shape, I suppose from the pressure of their perfect co-adaptation,



this idea, however, is, to a great extent, incorrect, or rather it is not comprehensive enough, so we may dismiss it at once. Professor Owen in his work, entitled "Odontography," states that the result of his researches into human teeth goes to prove that the enamel is composed of a series of long and slender hexagonal prismatic calcigerous fibres of various lengths, most of which rest in slight, but regular depressions in the periphery of the dentine, from whence they proceed at right angles on their way to the external

surface, but very few reach that surface, though some do, the rest thin out at greater or lesser distances, when fresh fibres fill in the vacant spaces and dovetail with those that have terminated; these fibres pursue a wavy course, the curves sometimes being parellel and sometimes opposed, the fibres are also delicately and minutely striated. The Professor also considers that there is evidence to show that it is probable that each fibre is a solid body surrounded by a capsule composed principally of animal tissue, while, the internal solid fibre is formed almost solely of calcareous salts. In conjunction with Retzius and Dr. Schwann, he believes that the striæ are formed of granular matter arranged in the external capsule, and he thinks that the fact that striæ are not present in fossil mammalian teeth, tends to support this idea, because their absence may depend upon the "destruction of the original organic constituent of the enamel."

Mr. Tomes, perhaps one of our best dental anatomists, was the first to point out the fallacy of the supposed constant hexagonal shape of the fibres; he shewed that a transverse section of the tubules exhibited, occasionally, an hexagonal contour, but that more frequently they were round, irregular, and even square. He also states that the inner ends of the fibres rest upon, and are united to the dentine, and the outer form the periphery of the tooth. Mr. Tomes thus appears to consider that the fibres run directly from the dentine to the external surface of the tooth, (though he does not say so directly); that they are therefore uniform in length and not prismatic; and that there are not necessarily supplemental fibres to fill in the interspaces caused by the fibres radiating from the centre to the periphery, he thinks, however, that their presence "need not be doubted." At any rate he does not consider that the interspaces can be filled in by any other method, for he says, that there is "no reason for supposing that the fibres are subject to a gradual enlargement," as stated by Professor Owen. But on all these points he appears to be in doubt because he sums up thus, "the waved course of the fibres, and the consequent difficulty of tracing a series, from the surface of the dentine to the surface of the enamel, together with the structural peculiarities of the tissue, render such a demonstration unsatisfactory." Mr. Tomes has gone further than this against Professor Owen's ideas,

he tries to prove that the enamel fibres are not composed in the manner suggested by that anatomist, but are formed of a series of cellular spaces, although he agrees that originally they were perfect fibres, but when fully developed their character is changed. Fully developed, healthy enamel is therefore, according to him, composed of cellular spaces arranged according to the dispositions of the original fibres, the lateral walls of each cell being united to the walls of the surrounding cellular fibres. According to this idea, enamel is a perfect piece of honeycomb. In the centre of each cell, Mr. Tomes places a mass of granular matter, and he believes that it is the alternation of these dark masses and light interspaces that causes the striated appearance. The method he adopted in order to shew that this was the cause of the striation, was to make a vertical section of a piece of enamel, and then apply a few drops of dilute Hydrochloric acid (1 part of acid to 12 of distilled water) for two or three seconds; this treatment renders the striæ much more apparent, and he argues that this is because the granular masses have been dissolved out of the cells that had been opened in making the section, while those cells situated more deeply and therefore not opened, retained their granular matter, and were more distinctly visible through the emptied superficial fibres. How he derives any support to his idea from this experiment I cannot discover, but I shall treat of it more fully shortly. He finds the most support for his opinion, he thinks, when this dilute acid is applied to a transverse or oblique section of the fibres, for by this means the mouths of the cut fibres are rendered more distinct, and present a honeycomb appearance. Now this is, in my opinion, even more absurd than the other idea, because we all know that if we take a bundle of hollow fibres, in which the fibres were perfectly co-adapted, and cut it transversely or obliquely, that we would find a honeycomb appearance.

Such is a brief epitome of the results arrived by these two great odontologists, and it will be seen that they are almost diametrically opposed to one another. Finding such to be the case, I determined to pursue investigations for myself, and I think I have arrived at the truth at last. My researches go to prove Professor Owen more nearly right than Mr. Tomes, but occasionally I side with Mr. Tomes. I have also discovered one or two points that I

think will materially help us in describing the processes of decay. These discoveries may not be new, certainly I cannot find any mention of them in Mr. Tomes' work, which is the latest book on the subject I have read. According to my researches then, enamel is composed of fibres which run from the dentine towards the periphery, and terminate at the external surface. The inner extremities of these fibres rest in slight depressions on the peripheral surface of the dentine, but whether there is any communication with the dentinal tubules I cannot say. I am inclined to think that there is a connection between them; however, I have not been able to prove this, I only consider it probable because I possess sections in which the ultimate branches penetrate the enamel, and on account of the manner of the formation of the fibres. In Fig. II. you will see the branches entering into the enamel and gradually becoming finer and finer the further they proceed into that structure. The external extremities of the enamel fibres I have said, terminate at the periphery, but they terminate in two ways, in one the fibres run distinctly to the external surface, in the other, just before reaching that surface, they become blended and confused and often disappear altogether, giving the enamel the appearance of being covered by an external coat of an almost homogeneous tissue, which, however, gradually merges into true enamel tissue as it proceeds inwards, there being no distinct line of demarcation. The fibres run from the dentine to the external surface, generally in a very wavy manner, and almost, as it were, in bundles, one bundle interlacing with the other in a very intricate manner. The fasciculate appearance is very well shewn in Fig. V., which is a vertical section of a piece of enamel, where some of the fibres have been cut transversely, and others vertically. In the enamel of a bull-dog's tooth, these alternations in a vertical section are most beautifully seen. That the fibres are much waved in their course is also rendered evident in those that are cut vertically and parallel to their curve, we also find that in a fasciculus of fibres the curves of the tubules are parallel to one another, but the curve of one fasciculus is opposed to that of its neighbour, while other fibres cross these opposing ones at right angles, at least, I think this the only way by which the transverse sections of the fibres in Fig. V. can be

explained. In a vertical section of enamel it will be found that very few of the fibres extend to any distance, that some thin out to a point, others end by a round or blunt extremity, and that other supposed fibres fit into the interspaces left by those that appear to terminate, this appearance, in conjunction with the transversely cut fibres, is more easily explained by the curvature of the fibres than by Professor Owen's short prismatic fibres. I have sketched here some curved tubes, very roughly indeed, and have drawn a vertical line through them, and in conjunction I have placed the appearance that such a vertical section would possess (these tubes are supposed to be passing from the dentine to the external surface of the enamel), such a line through A will give a perfectly transverse section, through B an oblique one, while through C the tube will appear cut vertically, and with pointed or rounded ends, according to whether the tubule was hexagonal, square, or rounded; also the longer the curve through which the section C is made, the longer will be the supposed complete fibre of Owen. This idea of continuous curved tubes clears up at once the apparent intricacy of a vertical section, and we can easily see how enamel built up in this manner will be much stronger and more durable than if it was a mass of short fibres arranged "higgledy piggledy." Professor Owen's idea is almost an absurdity, unless he can prove that his short fibres are strongly curved, if they are not much curved, then, according to him, they will have to be arranged something like the rough etching I have given on the left hand of the woodcut, in order to represent the ideal vertical section I have shewn there. Now in those bundles of fibres, of which each separate tubule presents a wave parallel to that of its neighbour, it will be found that in healthy enamel, each fibre is in close conjunction, if not in coalescence, with its immediate tubules, when there is coalescence, a transverse section shews the fibres to be hexagonal in shape, undoubtedly from the mutual pressure of their perfect co-adaptation, but more frequently they are only in conjunction, there being interspaces of homogeneous tissue between them, as shewn in Fig. IV., which is a transverse section of a piece of enamel from an undecayed tooth of a person about 50 years of age. It is the presence of these variable interspaces that causes the enamel fibres to be round, irregular, and even

square in outline. But there can be no doubt that in perfectly healthy enamel, pertaining to a fully developed tooth, the fibres ought to be hexagonal in shape, but such a state of things appears to be very rare, for in all undeveloped and in most developed teeth, the fibres are separated from each other by greater or lesser interspaces. With regard to the formation of the fibres I completely deny Mr. Tomes' theory of it, and am perfectly convinced that Professor Owen's researches are nearest the truth. The fibres are undoubtedly composed of a central tubule, whether of solid matter or not I do not know, closely surrounded by a capsular membrane. I have been fortunate enough to have made sections shewing the internal column and the external capsule, and I have given in Fig. IV., a drawing, by the aid of the camera, of a few of them; in this case it is evident that the capsule is widely separated from the internal tubule from some cause or other, thus rendering it more distinct, but generally it is very difficult to distinguish, because, as suggested by Professor Owen, it closely surrounds the tubule. The nuclear appearance in the centre of the inner disc, is probably due to the refraction of the oblique light, if so, it may then be solid and flat, but if the internal fibre was formed of some semi-plastic material which had contracted at its central point after being cut into a thin section, it would present a similar appearance.

We have now to deal with the cause of the striation. There can be no doubt that the human enamel fibres are striated, but the question is, whether Professor Owen is right in supposing that the striation is caused by granular matter in the capsule, or Mr. Tomes, in making it due to masses of granular matter in the interior of the fibre. Mr. Tomes is certainly wrong, and Professor Owen is right to a certain extent. Allow me to state here, that in pursuing these researches, I have followed the methods given by Mr. Tomes, first examining the tissue untouched by acid, and again after the application of acid for greater or lesser periods; I have also employed the solid and the hollow beams of light with the $\frac{1}{8}$th of an inch object glass, and an eye-piece that raised the magnifying power to 1,300 diameters, and by means of the prism camera I have been enabled to draw the different parts magnified to that great extent. The means I have used, over and above these, I shall refer to directly. First,

then, the striation of the fibres, untouched by acid, is generally very faint, and presents the appearance shewn in Fig. II., even when magnified 700 diameters; the application of the dilute Hydrochloric acid for a second or two renders the striæ much more distinct. With a comparatively low power, like 700 diameters, it is impossible to say what it is that produces the striation, for the appearance changes on the slightest alteration of the focus; a minute turn of the fine adjustment, and there are square dark portions with narrower intervals of light spaces, another minute turn, and these appearances are reversed, yet all the time the fibres remain distinctly defined. My good fortune has again befriended me, and in some of my sections I have obtained enamel fibres standing clearly out from the mass, in which the striation is very strongly marked indeed, and does not alter with minute changes of focus; Fig. III. shows a portion of such a fibre. I grant that under power of 300 diameters, these fibres do appear somewhat cellular, but apply the highest power I have mentioned, and the fallacy of Mr. Tomes' cellular hypothesis is at once exposed. Under this power, the fibres, when untouched by acid, present a distinct tube-wall, and the striæ appear like narrow circular discs, these are what were light spaces under a lower power, and the intervals, which appeared as dark squares, are now seen to be quite clear and free from granular matter. The discs or stria, look granular, but what are they? Are they not the walls that divide the fibres into cells, as stated by Mr. Tomes? Certainly not; catch a fibre that has been cut through vertically, and it will be seen that the walls that have been divided, when in focus, present dark spots, one on each side of the fibre, while the intermediate portion is out of focus, but can be seen directly the focus is altered, but then the dark spots have disappeared. This shows clearly that the striæ, whatever they are, are in the capsule, and are not boundaries between two cells, for in that case, a striation would all be in focus at the same time. The same appearance is found in the enamel of a bulldog, greyhound, and rabbit, only in their case it is fainter. Let us now apply the acid for about 20 seconds to the vertically cut fibres, then examine the specimen when dry or mounted in balsam. The dry slide is the best; the appearances are the same whichever method is pursued, but the balsam makes the

tissue too clear. In the dog it will be found that the walls of the fibres distinctly coalesce, but only here and there apparently, there being small spaces at short distances from each other, but these minute openings are not spaces left by the want of union between the fibres, but places from which the granular matter has been dissolved out. Fig. VI. represents a vertical section of such fibre-walls, but it is very difficult to shew it properly on paper, though it is distinct enough under the microscope, at least it is so to me, and every microscopist to whom I have exhibited the sections. In a transverse section, still taking the dog's enamel, these spaces are also very evident in certain fibres that have been cut at the point of striation, and they appear to shew that the granular matter is arranged in cells in the capsule, and not in a continuous ring; and I also find, that in those fibres that are shewn vertically, but are not cut, a slight change of focus, though not sufficient to destroy the distinct definition of the fibre, causes the striæ to assume the appearance of two or three cells, placed side by side. Such are the facts in the enamel of a dog's tooth, and the same appearances can be traced in the human enamel. Fig. IV. pourtrays the spaces in the capsule, only here I have made them dark, because in order to keep the internal fibre in focus, the spaces appeared so; but when placed in focus, they become distinctly hollow spaces. Whether the striæ are really minute cellular spaces in the capsule, containing granular matter, I cannot say positively but I think so; it may be that this cell aspect is due to only portions of the granular matter being dissolved out, but why this should be the case if the striations were opened throughout, as they evidently are in some of my transverse sections, is a greater puzzle to me than the other idea. The latter supposition has not been broached but still it might be.

Just after having written the above remarks it occurred to me that I could easily prove that I *had* found hollow spaces in the fibre-wall. I took a vertical section of enamel in which the fibres were cut vertically, obliquely, and transversely, and applied acid to it for about 20 seconds; I then examined it under the microscope, and finding all the characters I have detailed, I dropped a little turpentine upon the section in order to dissolve off a superficial portion of the Canada balsam that fixed the section

to the slide and filled the small cavaties, rendering them too transparent. When the section was dry, the spaces in the fibre-wall were more distinct than ever being empty. Now came my crucial test, I applied a drop of ink for one or two seconds, and on examination I found that the spaces that had been filled with Canada balsam were now filled with ink and the fibre-wall was studded with little black spots, but only in those places where the spaces had been. The ink did not creep all round the tubule, as it would have done if the striæ had been hollow tubes, the natural conclusion therefore is, that the striation is due to minute cells containing granular matter in the fibre-wall and arranged so as to present, when viewed in the aggregate, an appearance of striæ. While referring to this method of treatment, I may say that I had frequently applied ink alone to sections before this but without any result, the ink left no trace behind it, evidently because the balsam permeated the whole tissue.

Whether the fibres enlarge or not as they proceed from the dentine towards the periphery, it is impossible for me to say positively; if Fig. III. is the true shape of the fibre, then it does enlarge; but in that example the tapering end of the fibre dips downwards among the other fibres so that the narrow portion is probably due to the overlapping of the adjacent tubules over its sides. Though I cannot speak decisively about their gradual enlargement, I do know that those fibres that are not in distinct coalesence with each other, dilate at every striation, another proof that the striæ are situated in the fibre-wall, for the reason of the bulging appears to be that the capsule is rendered thicker at that point by the granular cells.

Such are the results that my researches into the structure of healthy human enamel have attained, and I believe that my description of the cause of the striation is the correct one. Professor Owen seems to have had an idea that such might be the case, for he says "in the human subject, it is probable that the cavity of the cylinder may be sub-divided by a multiplication of delicate nucleoli into compartments; or that the remains of such nucleoli, may cause a modification of the *walls* of the cylinder, and so produce the characteristic transverse striæ of the enamel fibres." This passage has not influenced my ideas in the slightest, because I did not hit upon it, until the whole of this paper

had been written. I, therefore, look upon Professor Owen's idea as to what might be the cause, as a corroboration of what my researches prove, is the cause of the striation.

In my next paper I shall speak of my researches into the minute structure of the dentine.

EXPLANATION OF PLATE.

Fig. I.—Vertical section of a portion of the crown of a human molar. Magnified 20 diams.

Fig. II.—Dentinal tubules passing into the enamel. Magnified 400 diams.

Fig. III.—Enamel fibre shewing striæ, after treatment with dilute Hydrochloric acid. Magnified 300 diams.

Fig. IV.—Transverse section of human enamel, after treatment with the dilute acid. Magnified 1300 diams.

Fig. V.—Vertical section of enamel showing fibres cut transversely between fibres cut vertically, after treatment with acid. Magnified 250 diams.

Fig. VI.—Vertical section of enamel of bulldog, shewing the spaces in the fibre-wall after treatment with the dilute acid. Magnified 1300 diams.

TO THE
EDITOR OF "THE MONTHLY REVIEW OF DENTAL SURGERY."

SIR,—During several years' extensive practice in gold filling, I have found cork to be decidedly the best substance to use for capping nerves, both on account of its indestructible and greatly superior non-conducting properties. I have been in the habit of treating small pieces with either *creosote* or *carbolic acid*, and then making one side *adhesive*, so as to retain it in position whilst filling the tooth, but owing to the considerable difficulty I experienced in cutting and preparing it had almost given it up. However, some time ago I chanced to mention it to a friend of mine, Mr. Hy. Peet, cork cutter, and requested him to manufacture me some, which has resulted in his bringing out a very beautiful preparation, called by him "*Adhesive Carbolized Cork*," and which I can most confidently recommend to the

profession as not only the best possible Nerve Capping, but also as a great saving of valuable time, which alone, I think, will ensure its being generally used.

Thanking you for the insertion of this letter,

I am, Sir,

Yours very truly,

GURNELL E. HAMMOND.

November 28th, 1874.

ODONTOMES.

(TRAITÉ DES TUMEURS. PAR PAUL BROCA).

(*Continued from page* 262.)

B. ODONTOPLASTIC BULBOUS ODONTOMES.

I SHALL describe these tumours according to the specimens which have been taken from the human subject.

(1.) At the time they first appear the cortical layer of the bulb already possesses a row of dentinal cells, which later produce dentine; and there is found besides, in the deepest layer of enamel, a continuous row of special cells which produce enamel. The pulp, very vascular, presents as yet only the fibroplastic elements with a small quantity of connective tissue, but it has a tendency to produce those little globulous heaps of phosphate of lime, which we designate as dentinal grains, and which are formed normally when dentification is effected in the cortical layer of the bulb.

Thus, although as yet in the follicle the parts are quite soft, the tissues which ought to give birth to enamel, dentine, and to dentinal grains, are already formed, and disposed to undergo the evolution which will produce the hard parts of the tooth.

This granted, it can be understood that the work of hypertrophy which the odontomes bring forth, can modify together or separately the respective properties of the tissues which the dental follicle encloses. One or other of these properties may be, perhaps, augmented, lessened, or annihilated; and according as the injury affects more particularly such or such part of the bulb, certain phenomena of ulterior evolution may be accelerated or exaggerated, whilst others are retarded, attenuated, or suppressed. The result is, that the accidental production, although

always the same in its primitive or essential constitution, may show in its ulterior evolution, very different combinations, and be clothed in very various forms.

I do not know any variety of odontomes which could be attributed to a primitive disease of the enamel organ, which, besides not being vascular, does not appear to be susceptible to isolated hypertrophy. I should say the same for the row of dentinal cells which characterise the cortical layer of the bulb. The disturbances in nutrition, of which this and the preceding layer may become the seat, are only the consecutive effects of diseases of the pulp, the only vascular part of the bulb.

Bulbous odontomes then, are essentially constituted by hypertrophy of the pulp. The pulp in hypertrophying works against, and compresses at once the cortical layer which produces dentine, and the enamel organ which produces enamel. This compression may proceed as far as complete atrophy of the two principal agents of dentification. The enamel organ having but a gelatinous consistency is always atrophied first. The cortical layer of the bulb, endowed with greater vitality and consistency, resists better than the former the excentric pressure of the hypertrophied pulp. Always when it is destroyed or altered to the point of losing its property of dentification, the enamel organ perishes with it, or even before it, whilst it may preserve its structure and properties in many cases where the enamel organ is destroyed. The result is, that enamel is never found without dentine in dentified odontomes, whilst, on the contrary, there exist odontomes composed of a great quantity of dentine without a trace of enamel. When the enamel organ and the cortical layer of the bulb are entirely atrophied, the tumour cannot become the seat of true dentification. But the pulp may still preserve the property of producing dentinal grains, and this property may even be exaggerated. Thus may be explained the formation of a special variety of odontoplastic odontomes, discovered, and perfectly described by M. Robin. The tumour then presents the consistency of a very hard fibroma. With the microscope may be discovered a fundamental woof, fibrous and fibroplastic, quite like the normal tissue of the pulp, but in addition is found in innumerable quantities in the centre of this woof, dentinal grains, so near to each other that the section of the tumour presents

the colour and fine granulous aspect of a section of a potatoe. M. Robin's description is based upon the study of the two tumours removed by M. Nelaton.

One of these cases is preserved in the Dupuytren museum, No. 384, E. I have recently examined it under the microscope. The prolonged maceration in alchohol has not in any way modified the structure, and I was able to establish by proof all the characteristics pointed out by M. Robin. I shall only add that there is in the centre of this tumour a cavity, tolerably regular, of the size of a filbert, which had been opened by the section and which must have enclosed a liquid. The presence of an interstitial cyst in the centre of an hypertrophied tumour is very ordinary, but I draw notice to this fact, which allows an explanation of the existence of certain cavities which are sometimes met with in the centre of dentified odontomes.

Can odontoplastic odontomes, characterised by the predominance of dentinal grains, become the seat of true dentification? I can say that that which I examined in the Dupuytren museum, does not present on its surface any trace of dentinal cells, nor of enamel cells; this tumour, then, cannot be dentified. I must add that the multiplication of dentinal grains gives the tumour very great hardness, which seems naturally to determine constant atrophy of the cortical layer of the bulb, and with still more reason the enamel organ.

When the dentinal grains are not more numerous in the hypertrophied than in the normal pulp, the tumour no longer presents a tube-like aspect, and resembles either a fibroma or a fibro-plastic tumour. In the first case it may yet become hard enough to determine atrophy of the odontogenic layers and to render dentification impossible; but in the second case, the morbid mass, much more soft generally, shows either partly or entirely the dentinal cells of the cortical layer of the bulb, and often even of the softest and most superficial row of enamel cells, conditions which allow the tumour, later, to become more or less completely dentified by constituting one or more masses composed, as the case may be, only of dentine, or of dentine and enamel. The phenomena of this dentification do not differ essentially from those of normal dentification. Dentine is produced at the expense of dentinal cells, con-

sisting, at first, of small caps of dentine which gain, later, in surface and in thickness in the same manner as healthy bulbs. The enamel is formed, in its turn, gradually everywhere where the dentine caps are covered with a layer of enamel cells. But the conditions created by the pathological state give to these dental productions the form and disposition which differ considerably from the type of normal teeth. The pulp in hypertrophy may preserve its rounded contour, and an almost smooth surface; if such an odontome had just become dentified, the result would doubtless be that of a dental globule, united and even polished, whose periosteum would be constituted like that of the crown of the tooth, by a layer of enamel more or less regularly laid upon a central mass of dentine. This result seems to be possible, but I have not yet observed it. There is even some reason to believe that when the pulp is developed in the form of a globulous tumour, dentification would be considerably compromised; experience proves, in fact, that odontomes of this form are in general more hard than others which expose the odontogenic layers to become atrophied under the compression.

THE SURGERY OF THE MOUTH,

By FRANCIS MASON, F.R.C.S.,

SENIOR ASSISTANT-SURGEON AND LECTURER ON ANATOMY AT ST. THOMAS'S HOSPITAL.

(*Continued from vol. 3, page 222.*)

DISEASES OF THE BONES OF THE FACE (*continued*).

II. HYPERTROPHY.
III. ATROPHY.
IV. OSTITIS.
V. CIRCUMSCRIBED SUPPURATION, OR CHRONIC ABSCESS.
VI. DIFFUSE SUPPURATION OR OSTEOMYELITIS.
VII. NEURALGIA.

II. HYPERTROPHY.

This is a disease by no means commonly met with. Attacking as it generally does such bones as are made up more especially of cancellated tissue, it is occasionally found in the bones of the face. The disease appears to be one of early life, and chiefly affects the superior maxilla, and, in contradistinction to the enlargement that is occa-

sioned by inflammation, it is comparatively painless in its progress. One case is referred to in which "the superior maxilla was converted into a solid mass with complete obliteration of the antrum,"* and other cases are recorded, in which the orbit has been so involved as to displace the eye, and in extreme instances, such as those recorded by Howship and du Wrang, the patients have died lunatics. Possibly some of these examples may partake of the nature of exostosis, but the disease hypertrophy—that is, a simple enlargement—is doubtless as much entitled to a place in the osseous system as is hypertrophy of the soft tissues. To this affection Virchow has given the name of *Leontiasis ossea.*

The *treatment*, as may be gathered from the foregoing observations, is rather one of *convenance*, and any operation that may be performed is usually undertaken with the view of either improving personal appearance, or of relieving mechanical deformity. All the growth, or as much of it as is necessary, may be removed, and in many instances a partial operation suffices to arrest the progress of the disease. A similar satisfactory result occasionally follows the removal of a simple tumour of the soft parts, as any surgeon can testify, for example, in cases of fatty tumours, or of hypertrophied breasts, small portions of the growth have been inadvertently left, and in some instances in which the opportunity has been afforded of watching the patient for years, no return has taken place. And so with regard to the removal of enlarged tonsils, we do not extirpate the whole gland, but merely slice off the redundant portion. In such cases partial removal unquestionably arrests further growth.

III. ATROPHY.

This too, is very seldom seen, and of the facial bones the lower jaw is that which is said to be most especially liable to it. I need scarcely refer to atrophy in the long bones or in the soft textures, for it is well known that want of use in any part will give rise to it. For example, in diseases of the joints, or in infantile paralysis, the bones as well as the muscles of the affected limb may become diminished in size, owing to their remaining in a state of inactivity; hence the surgeon arouses muscular action by

* "Druitt's Vade Mecum," 6th ed., p. 203.

the application of galvanism. Want of nerve supply too, will occasion this condition. Mr. Stanley, alluding to atrophy of bone,* refers to a peculiarly interesting case of atrophy of the lower jaw in a child aged two years, who had an attack of inflammation of the brain, accompanied by convulsions, during which the bone became immovably fixed, with the mouth closed, and in this condition it remained. At the age of ten years, when the rest of the face had attained its full development, the lower jaw, still motionless, had not grown. It remained of the size it was at the age of two years, and a very remarkable deformity of the face was thus produced. Another case of a similar kind, is related by Dr. Maas, of Breslau, of a man aged 27, who had bilateral ankylosis of the lower jaw. It came on after an attack of scarlet fever when he was seven years old, and since the age of ten he has not been able to move the jaw at all. The jaw was very imperfectly developed.†

In other cases one side only of the jaw is affected; thus M. Berard has recorded a case of atrophy of the left side of the lower jaw, caused by adhesion, resulting from gangrene following fever.‡ As a rule, little can be done by way of *treatment*, but in suitable cases the jaw may be divided after Esmarch's plan, of which I shall speak hereafter. Were the joint released, galvanism might be applied with advantage.

IV. OSTITIS.

As already stated, it is well-nigh impossible to draw a defined line between inflammation of the periosteum-periostitis, and inflammation of the bone itself—ostitis. This difficulty necessarily arises from the intimate connexion that exists between the bone and its covering. I have, myself, met with numerous examples in illustration of this difficulty, and every practical surgeon must be familiar with similar instances. The following case treated by Mr. H. J. Johnson, at St. George's Hospital, is one in point. The patient was a woman, who had a tumour of the right ascending ramus of the inferior maxilla. It was treated by counter-irritants locally applied, and with sarsaparilla given internally. Mr. Johnson expressed his opinion that

* On "Diseases of the bones," p. 9.

† *Brit. Med. Journal*, June 1, 1872, p. 585.

‡ *Lancet*, 1834, vol. 2, p. 561.

the tumour might be connected with the substance of the bone, yet he regarded it "rather *on* than *of* the jaw,"* and Mr. Stanley in referring to this subject says that a constant correspondence may be remarked between inflammation of the medullary membrane and of the periosteum, and of the substance of the bone itself, so that it is difficult on looking at a bone in which there has been for some time a diseased process carried on, to determine in which tissue the affection first commenced and the order in which it had supervened in others. For instance, if an abcess form in the medullary tissue the irritation is speedily propagated to the corresponding part of the periosteum in which suppuration may take place between it and the bone.† And again the same writer says "the diagnosis of these various enlargements of bone cannot always be made during life, nor is this practically of consequence; it is sufficient to know that inflammation in bone occasions its enlargement and that inflammation of periosteum occasions the enlargement of bone by osseous deposits on its surface."‡

Every now and then, however, well-marked cases of ostitis are brought before the notice of the surgeon, and they may be either of the acute or chronic form. In the *acute* variety the patient complains of a dull aching pain, which, as a rule, increases in severity at night. There may be some constitutional disturbance, and often the first symptom that attracts the patient's attention is a distinct rigor. Pathologically, inflammation of bone much resembles inflammation in the soft tissues, its peculiar characteristic being the comparative slow progress it makes. There is greatly increased vascularity in the part, which becomes of a deep red colour, the inflamed bone bleeding, if wounded, as freely as a wound in the soft parts does. There is some enlargement of the bone which is softened from the absorption of part of the earthy matter, and the lamellæ are infiltrated with serous exudation.

It is especially in the bones of the upper and lower jaw that any deviations from the healthy standard are to be observed. This may be partly accounted for by the fact that these parts are more subject to the vicissitudes of temperature, and are more liable to injury than their

* *Lancet*, 1844, vol. 2, p. 90.
† *Med. Gazette*, vol. 20, p. 241.
‡ *Loc. cit.*, p. 25.

neighbours, external violence being a common cause of inflammatory action. Moreover, their intimate association with the teeth would render them additionally predisposed to disease. Yet ostitis does occasionally come on without an obvious local exciting cause, when it must be attributed to some constitutional disturbance; and on this point of constitutional disturbance, I venture to say that bone is no less liable to inflammation than are the soft parts, and just as one patient will have a boil, carbuncle, or even an abscess on the cheek, so another will have inflammation in one or more bones.

As ostitis progresses, some redness of the skin follows, and either the inflammation subsides—undergoes resolution—or so extends as to cause ulceration or necrosis of the part. In some instances there may be so much inflammatory effusion as to cause pressure on important nerves, thereby interfering with their formation, and leading to neuralgia in one or other form.

In *chronic ostitis* the symptoms are less marked. In this variety especially, there is, instead of the softening of the bony tissue already alluded to in the acute form, increased hardness and consolidation. The cancellated tissue is more or less filled with plastic deposit, which, as the disease steadily advances, becomes converted into almost a complete bony substance. When such is the case, the part affected, as a rule, remains permanently enlarged.

With regard to the *treatment*. In the acute form, the state of the general system should be especially inquired into. The bowels should be properly regulated, and all means used to allay inflammatory action by febrifuge medicines. Should the pain be very severe, opium, or henbane may be given, and if the patient is unable to sleep, 20 or 30 grains of the hydrate of chloral may be administered at bedtime. Locally fomentations frequently applied are exceedingly useful, for they tend to relieve the soft tissues into which the products of inflammation may be absorbed. In some cases cold lotions are more agreeable to the patient, and must be used in suitable cases. In the *chronic* form counter-irritation may be employed. Blisters or the tincture of iodine may be applied, and it should be remembered that they ought not to be placed immediately over, but at some little distance from the inflamed part, otherwise they are apt to excite rather than diminish

inflammatory mischief. Their action is to be regarded as derivative and not excitant. The iodide of potassium, acting as it does as a charm in periostitis, is equally serviceable in ostitis, especially in the chronic form, and from three to five or even ten grains, may be given three times a day, in an infusion of quassiæ. If necessary some ferruginous preparation, five grains of the ammonio-citrate of iron for example, may be added to each dose of the mixture. An alterative plan of treatment is also very advantageous, five grains of the pil. hyd. subchlor. comp. being administered every night at bed-time.

v. CIRCUMSCRIBED SUPPURATION, OR CHRONIC ABSCESS.

This is stated to be a very rare disease, but inasmuch as some of the so-called dentigerous (endo-odontoid*) and even the odontoid and alveolar cysts are known occasionally to undergo suppuration, it must be extremely difficult to distinguish accurately between the two affections. Hence I venture to think that in many cases the one disease has been frequently confounded with the other. Mr. Thomas Annandale, jun., reports a case which was under the care of his father, and which he considers unique. It is one of chronic internal abscess of the lower jaw, occurring in a boy aged 10, who received a blow on the left side of the face and nose some months previously. Thirteen months before he sought advice his mother noticed the lad's face swelled, but he never suffered the slightest pain from it. On September 18, 1860, Mr. Annandale gouged the tumour, but concluded that it was solid. On September 25th the tumour was removed by sawing through the bone opposite the first bicuspid tooth and disarticulating the jaw. On making a section through the tumour in the longitudinal direction, a cavity, the size of a horse bean, was exposed, it was filled with thick purulent matter†. The reader will observe that in this case the patient had no pain whatever, and this painlessness is singularly at variance with the symptoms usually observed iu abscess of the bone in other parts of the body. Mr. Annandale does not fail to direct attention to this point, and refers to cases of abscess in the clavicle, the femur, tibia, and in other bones, but he has been unable to discover another instance

* See *Monthly Review of Dental Surgery*, vol. 2, 1873, p. 308.
† *Edinburgh Med. Journal*, Dec. 1860, p. 519.

of positive circumscribed abscess in the lower jaw*. Yet the late Mr. Liston refers to a possibly similar disease under the old fashioned title of spina ventosa. He says that *spina ventosa* consists of a collection of pus between the plates of the hard bone of which the lower jaw is formed. As it increases in quantity, the cellular or cancellated structure is opened out or destroyed, the outer plates becoming thinner and thinner. The swelling feels hard, and may be mistaken for a solid tumour of the face. Extraction of a stump may suffice to cure it, if not, in some cases it may be necessary to cut away a part of the bony parietes in order to evacuate the matter more freely. The sac contains pus, and is lined by a delicate secreting membrane like an ordinary abscess†.

VI. DIFFUSE SUPPURATION, OR OSTEOMYELITIS.

This is not a common affection, but a disease somewhat resembling the condition found in other bones of the body may be occasionally met with. It is noticed especially in connexion with a compound fracture of any of the bones of the face, but is chiefly to be observed in severe injuries of the lower jaw, the structure of which being somewhat similar to the "diploë" of the skull, is liable to be infiltrated with diffuse suppuration. In some of such cases I have pressed the softened and infiltrated bone, not merely the soft parts, and have caused a purulent fluid to exude, In these instances there is more or less pain, and the surrounding soft textures participate in the inflammatory action; moreover there is generally a good deal of constitutional disturbance, the temperature of the patient rising considerably. It is not often that death follows this condition, the usual sequel being necrosis of a portion of bone, which either exfoliates spontaneously, or may require the aid of the surgeon for its removal. This subject will be again referred to in subsequent pages.

VII. NEURALGIA.

This disease is, I believe, scarcely sufficiently recognised,

* The museum of St. Thomas's Hospital contains one of the best collections of abscess in almost every bone in the body, but there is at present (1874) no well marked example of abscess in the lower jaw. (Sect. C., Disease of Bone.)

† *Lancet*, 1843-44, vol. 1, p. 171.

the symptoms being usually referable to neuralgia of the soft parts, the real bony affection being frequently completely ignored. Professor Gross draws attention to a condition which he designates "neuralgia of the lower jaw." "It is," he says, "chiefly located either in the alveolar structure or in the alveolar process of edentulous persons, and generally occurs in old people. The gum is nearly always hard, and adheres firmly to the alveolar process. The pain varies, it may either be dull, heavy, and aching, or sharp and darting; pressure relieves it." Dr. Gross thinks the affection depends on the compression of the minute nerves in the alveolar process by the encroachment of osseous matter on their canals. He selects five cases as examples, and states that the only certain cure is the removal of a portion of the alveolar border with the curved cutting pliers. Of the five patients referred to, three were women aged 70, 80, and 33, and two men aged 64 and 57, respectively*. Stimulated by Dr. Gross' suggestion, I have myself operated in three cases with success, two were women, one aged 46, the other aged 53, and the third, a man, aged 56, but I have not had an opportunity of treating the disease in a case of edentulous jaw. The only other example I can find reported, is one by Mr. Jessop, of Leeds. The patient was a Jew, aged 18, who had had the left lower anterior bicuspid removed six months previously. He had persistent pain from that time, and after trying all anti-neuralgic remedies, Mr. Jessop cut down, and removed with bone forceps, a portion of the alveolar border; the relief was complete†.

Allied closely to this disease, is neuralgia of the periosteum, in which that membrane is exceedingly sensitive. In such cases, the removal of a portion of the affected periosteum alone, without interfering with the bone itself, is often productive of benefit.

OXYGEN GAS AS A REMEDY IN DISEASE.

Prof. J. L. Cabell, M.D., Univ., Va., regards oxygen gas as a most valuable agent in all diseases involving defective respiration, and as a tonic to improve assimilation in chronic diseases.—*Va. Med. Monthly.*

* *American Journal of the Medical Sciences*, July, 1870.

† *Brit. Med. Journal*, Jan. 7, 1871.

CLINICAL REMARKS ON CLEFT PALATE.

By FRANCIS MASON, F.R.C.S.,
SENIOR ASSISTANT-SURGEON AND LECTURER ON ANATOMY AT ST. THOMAS'S HOSPITAL.

GENTLEMEN,—By the courtesy of Mr. Simon, who has kindly placed his beds at my disposal during the vacation, I am enabled to direct your attention to several cases of cleft palate that have been under my observation within the last few weeks. In this group of cases you have seen instances of the deformity in most of its varied forms. As you know, I have operated on some of these patients, and I shall deal with the remainder as opportunity arises.

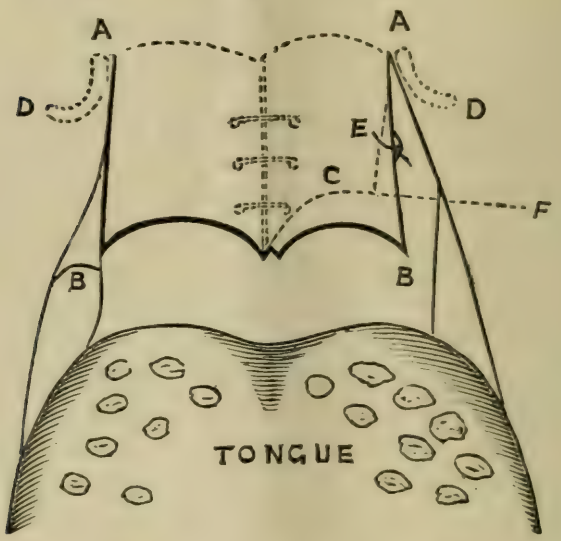
In the first place, you will recollect a child, aged ten months, who had a single harelip on the left side, with a fissure extending completely through the hard as well as through the soft palate. I closed the harelip, and I purpose operating on the fissured palate at some future time. Then there is a baby, about a fortnight old, who has a harelip on the left side, with a fissure in the soft palate only, the hard palate being implicated to a very slight extent, and that in front, which is a very rare condition. Then there is a girl, aged twelve, who has no harelip, but who has had a fissure in the soft palate alone. She has been operated on at another hospital with fair success, and she was admitted here in order that a hole of the size of a large pea, situated in the soft palate, might be closed. You will remember that I operated on this patient without chloroform, on August 1st. I pared the edges, and, after introducing two silk stitches, the parts came together very nicely. On the fourth day, however, one of the stitches gave way, and an unhealthy-looking surface remained. I told you at the time of the visit not to be dismayed at this untoward result, but to trust hopefully to the parts uniting by granulations. You now see that, at the expiration of a fortnight, there is only a minute aperture left, which is contracting day by day, and will, no doubt, eventually heal up.

I have noticed, in such cases as this, that the parts will occasionally give way, and I believe that the failure is due to the fact that the edge has not been sufficiently pared. Being a cicatrix, the margin is of low vitality, and very tough, so that the knife enters it with difficulty. The surgeon is therefore obliged to use a little force, and thus the

parts are apt to get slightly bruised. This bruising, combined with the diminished blood supply, rather favours the non-union of the edges. The whole cicatrix should, therefore, be removed. The girl was anxious to go home; but I persuaded her to remain a little while longer, in order that I might improve her voice by dividing the sides of her palate, in accordance with the method I advocated in 1869, an account of which you will find both in *The Lancet* of that year and in the St. Thomas's Hospital Reports for 1871. I performed this operation on August 19th; and the case presents one of the best examples I can adduce of the great improvement of the voice that follows this simple procedure.

Let me describe briefly the steps of the operation; and

FIG. 1.

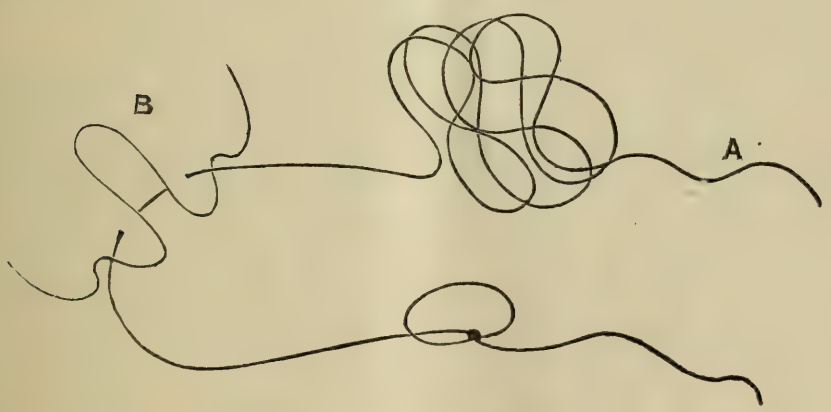


by the aid of this diagram (Fig. 1), perhaps my description may be rendered the more intelligible. A small, curved spatula is first placed behind the soft palate. It keeps the part steady, and also serves as a *point d'appui*. A sharp-pointed knife is then introduced from before backwards at A, in about the position of the inner edge of the hamular process (D); and the soft palate is cut completely through from A to B. The same thing is repeated on the other side, and the operation is then concluded. In the first few cases in which I operated, I hemmed the mucous membrane back and front, as indicated in the diagram (E); but I have long

since abandoned this practice as being unnecessary. You saw how simple the operation was. The girl had no chloroform, experienced little or no pain, and there was scarcely the least hæmorrhage. Two days afterwards you heard her read aloud, and you recollect how well, comparatively, she articulated. From the experience I have myself had, and from what I have seen in the hands of other surgeons, I am justified in believing that the improvement of the voice after the proceeding is, in most cases, very considerable. The operation may be undertaken at any time, either a fortnight or even a year, or longer, after the palate has been closed; and, moreover, it can be repeated as often as the surgeon thinks necessary. It is free from danger, almost painless, and the patient may, if he please, leave the house, or go to his business as usual.

In order to have a proper appreciation of cleft palate,

FIG. 2.



you must understand that it is a congenital deformity. It is not a mere rent or slit in the part, but an actual deficiency or want of tissue. Hence, however well satisfied the surgeon may be with his work, the palate still remains as a tight curtain stretched across between the mouth and posterior nares. The result is that, in speaking, the air, instead of passing into the mouth, gains ready access to the nostrils, and thus the peculiar nasal twang is occasioned. Now, if the sides be freely divided in the way referred to, the palate becomes converted into a huge uvula, so to speak. It is shortened and "puckered up," the point B being drawn up to C, so that, if it does not actually touch

the back of the pharynx, it approaches it so nearly as to divert the current of air from the nose into the mouth, and thus it obviates to a great extent the disagreeable guttural voice that is observable in all patients who are the subjects of this distressing deformity.

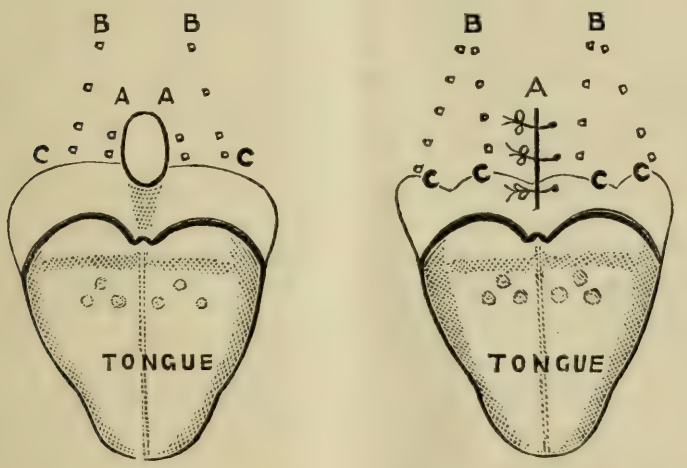
The next case of which I wish to speak is one in which I have been interested from the commencement to its termination, the cure being now all but complete. The patient is a servant-girl aged twenty-four, who has had a congenital fissure extending through the soft, and for about three-quarters of an inch through the hard, palate. There was no harelip. I closed the soft palate in October of last year, and drew your attention to a plan I occasionally adopt in bringing the edges together. It not unfrequently happens that in using the slip knot the threads become entangled. I therefore, before placing the end of the one thread through the loop of the other, make a figure of 8 on the former (Fig. 2, A; B represents the palate) around the forefinger and little finger of the left hand. By adopting this plan the thread runs as easily as possible.

In January last I operated on the hard palate according to Dieffenbach's plan, and strictly in the manner referred to by Sir William Fergusson in the *British Medical Journal* for March, 1874. (Sir William kindly explained his method of operating to me, and also lent me the requisite instruments.) The operation consists in dividing the bony palate on each side of the fissure. Those of you who were present on that occasion will remember that I had some difficulty in accomplishing this part of the operation, because of the toughness of the bone, and the proceeding looked somewhat clumsy and unsurgical. There was smart hæmorrhage, too, and the result was not quite satisfactory, for a small portion of bone exfoliated; and although the girl's palate was somewhat improved, yet I was conscious that more might be done for her. Accordingly, on her readmission recently, I operated again on August 1st. I first pared the edge freely, and then with a gimlet bored two holes in the margin (A A, Fig. 3), the object of which was to allow of the passage of the needle and thread. Then, recollecting the difficulty I had on the previous occasion of forcing the chisel through the bone, I made a series of holes with the gimlet exactly in the line in which the chisel was to be applied, B C. With the least pressure

of the instrument—an ordinary carpenter's chisel, which I had cut short—the bone was at once and most readily divided. The proceeding is exceedingly simple, and may be not inaptly compared to the perforated edges of postage and other stamps. There was very little hæmorrhage, and the patient said—for she did not take chloroform at any time—that it was painless in comparison with the previous operation. She progressed favourably, and when she left the hospital there was a small hole which was healing gradually by granulations.

There is yet one more patient of whom I must briefly speak—a boy aged four, with a fissure of the soft palate only, and without harelip. I operated on him under

FIG. 3.



chloroform on August 12th, and instead of following Sir William Fergusson's plan (as I generally do) of first dividing the muscles with a rectangular knife and then closing the cleft, I, in this instance, pared the edges first, and, after uniting them, divided the muscles according to Sédillot's method.* Nothing could have looked more promising, but, on the evening of the third day, the child sneezed violently, and the two front stitches gave way, but the uvula and a part of the palate held together. The parts are now healing by granulation, but possibly I may have to do something more for this case.

One word as to the age at which the operation for cleft

* Erichsen's Surgery, 5th edit., vol. ii., p. 357.

palate should be undertaken. Some of you recollect that in January, 1872, I operated successfully on a child two months old. In this case the fissure involved the soft palate only. I have operated at various ages, and although I am far from believing that it is necessary to wait until the age of fifteen or sixteen, yet I cannot but think that at the present day we are apt to go to the other extreme, by operating too early in life. Take this child as an instance. Through ignorance solely he did not carry out the necessary instructions to give the palate the best chance of uniting. He was constantly craving for food, and at times was very troublesome. You must have observed how cautiously he was fed, yet, notwithstanding the solicitous care that the attendants lavished upon him, the parts suddenly gave way, from no other reason, I believe, than his failing, from extreme youth, to appreciate the importance of perfect rest and quiet. Every case must of course be judged on its own merits, but I venture to think the age of six or seven will, as a rule, be found to be as early as is compatible with the successful issue of the operation.

Finally, there is one more case to which I should like briefly to refer. It is that of a strumous, unhealthy-looking girl aged about ten, who was in Alexandra ward. She had suffered some few years back from, probably, necrosis of the maxillary, palate, and nasal bones. At all events the disease is now quite cured, but she is left in a deplorable condition, for her nose is much flattened, and there is a large gap in place of the hard palate. The soft palate is perfectly normal, but the absence of the hard portion necessarily makes her articulate indistinctly. We frequently see cases of this kind, only in a minor degree, among the out-patients, and sufferers generally adopt the absurd practice of introducing a piece of rag, or other material, into the aperture, the effect of which is to cause by absorption the gradual enlargement of the opening. The voice is at once restored by this simple means, but it is restored at the expense of the bony palate. As a rule, these cases are not benefited by surgical interference. You can understand the reason of this if you reflect that there must be a considerable difference in the chance of repair between a part which has been in a diseased condition, and whose vitality is thereby lowered, and a part which, although deformed, is yet in every other respect perfectly

healthy. The case was not a favourable one for an operation, so I recommended her to have an artificial palate, and with this she will go through life without her neighbours being in the least aware of her condition.

Time will not permit me to enlarge on other cases, but I hope to have the opportunity of speaking of them on a future occasion.

Special Hospitals.

The late Lord Brougham, while delivering one of his Social Science presidental addresses, permitted a very fine set of artificial teeth to drop upon his manuscript. Consternation prevailed on the platform and in the hall. The vigorous octogenarian, however, required no sympathy. Making no attempt at concealment, he quietly picked up and adjusted the ivoried apparatus, and fixed it in sight of the audience, remarking, when the operation was successfully accomplished, "Ah, our teeth trouble us both when we are young and when we are old." Since then dentistry has made wonderful advances, and the new Dental Hospital on the south side of Leicester square may, in the evidence it gives of progress, be regarded as a beacon of hope to that far too numerous human family who suffer from the nagging, persistent plague which tortures the patient without affording him the excuses for rest and retirement allowed to other sufferers. Though last, this is not at all the least, of our Special hospitals, possessing a strong scientific staff, and having become a recognized school of dental surgery. At the top of the house there is a large operating saloon, where if required five-and-twenty forceps can operate over as many dental chairs; there is a lecture room with a valuable museum; and the building includes convenient waiting, extracting, and anæsthetic rooms. The Medical Committee in their latest report give a detailed account of work done, the primary principle of the hospital being that every poor applicant suffering pain shall have gratuitous advice together with any operative assistance immediately necessary, without the usual letter of introduction from governors.—*Daily News.*

PATHOLOGICAL SOCIETY.

Mr. Butlin exhibited a specimen of Osteoma of the Superior Maxilla. It was of interest on account of its long duration. The patient, who was thirty-nine at the time of operation, had been struck by a bottle at the age of eighteen, a swelling appearing soon after, together with pushing up of the eye; vision was not impaired, though constant pain was complained of. The growth, with the whole of the superior maxilla, was removed. The tumour presented the ordinary characteristics of exostosis. (Photographs were passed round of the patient before and after

the operation.)—Mr. Christopher Heath asked if the central hard part had been examined under the microscope, as he suspected some dental element existed therein, to which question Mr. Butlin replied in the negative.—*Lancet.*

ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

CHARLES VASEY, Esq., Vice-President, in the Chair.

The minutes of last meeting having been read and approved,

Mr. MOON exhibited a tape-carrier, manufactured by Messrs. Ash. The curve of the instrument adapted it for operating on the upper or lower teeth. The polishing surface of the tape could be turned to the front or the back so as to meet the interstitial surfaces.

THE PRESIDENT having invited remarks upon the burring engine exhibited at last meeting,

Mr. CHARLES TOMES said he had had the engine in use for about three months. The right angle attachment which belonged to it he had not got, but on the whole he liked it better than the Morrison engine. For using the large corundum discs or any point which it was desirable to use with a drawing cut towards the operator, he thought that the engine in question was the best, the fastening of the point being so absolutely secure.

Mr. SEWILL asked whether any member had devised a means of overcoming the difficulty with the right angle attachment—the unscrewing of the end piece.

Mr. HANKINS said he had that evening been consulting the Messrs. Ash in reference to this difficulty, and Messrs. Ash's assistants told him that they thought nothing could be done but to invent a new instrument altogether for the right angle attachment. If the operator was busy and wanted to use a larger drill there was great difficulty in removing the one that was in use as it was so firmly fixed.

THE PRESIDENT was sorry to hear that account of it because he considered the right angle attachment the most important part of it. In making experiments he had certainly found the difficulty that when the drill had been worked with, it tightened.

Mr. TURNER exhibited two impressions which had been

taken in plaster, and explained his mode of operating. In the first instance he made the handle of the tray into a funnel, which opened on to the palate of the tray, and the upper boundary of it was formed by the lower part of the anterior wall of the impression tray. The outer end of the handle was widened considerably, and it had a lip soldered round its outer free margin. On this tray he put a wall of wax round the whole of the outer margin and also across the margin of the palate. To the outer rim of the funnel he fixed a piece of sausage skin, and the wax was cut away wherever he wanted the plaster to come; consequently the front of the teeth, the upper parts of the gum, and wherever the plaster was not to come, were taken in wax. Where he wanted the plaster to come was where he wanted to fit the plates, and the plaster could not go anywhere else. When the wax was prepared in this manner, dents were made by which the air could pass out, and he returned the tray into the mouth, taking care that it came into its place again. He then withdrew it, oiled the inside of the funnel, poured the plaster into the bladder, returned the tray to the mouth, and injected the plaster into the space which he had made in the impression by cutting away the wax. By this method a model could be got with few or no fractures. The plan he thought was capable of being more largely developed.

Mr. CHARLES TOMES exhibited the following specimens which had been lately presented to the museum:—a small supernumerary tooth between the fangs of the lower molar, sent by Mr. Rose. An upper molar tooth, sent by Mr. Henry, the inner surface of the fangs of which shewed facets which had obviously been in contact with some hard body: some specimens of ordinary exanthematous necrosis in a child, bringing away with it the crypts of the permanent teeth, and the sequestrum from a case of necrosis involving the lingual walls of the alveolar of the front teeth with a scale of bone all round the lower maxilla, presented by Mr. Rose: specimen of necrosis of the socket of a perfectly sound tooth, and also specimen of a very large accumulation of tartar round the upper molar: some specimens of teeth united with one another.

THE PRESIDENT mentioned a case lately brought to St. George's Hospital of a woman, which resembled a growth of bone, but which proved an accumulation of tartar, which

was removed by an instrument, and the patient was relieved of her difficulty.

Mr. UNDERWOOD asked Mr. Turner whether in the preparation of his plaster casts any salt was used, and how long the cast was kept in the mouth before it was withdrawn?

Mr. TURNER said that in making his casts he found that any saline hardening medium produced so much cold upon the teeth of the patients that they objected to it, he therefore used tepid water. He was uncertain as to the time the plaster took to harden in the mouth, but he was guided by the time the plaster in the basin took to harden. He thought four or five minutes was the average time, which was no doubt too long; but the difficulty was in keeping quick-setting plaster at its proper pitch.

Dr. MURIE said that in the action of plaster with cold water a certain heat was produced, so that he could not see that there would be much difference made by Mr. Turner using tepid water. If it was desirable to have a quick-setting plaster a small quantity of water should be used and the setting should be made in smalls.

Mr. C. WHITE had found that a little tepid water made plaster of Paris set much more rapidly than cold water. For a long time he had not used any salt or alum, but simply mixed with the plaster a little scraping of some old model which made it set very rapidly indeed, and without the cold Mr. Turner spoke of. He found, however, that plaster of Paris was very difficult to handle, and to remedy this he had taken impressions in soft wax, keeping it in the mouth until it had set, thus avoiding the displacement of soft tissues and disagreeable breakages which followed the use of plaster.

Mr. SEWILL thought that, from his experience, the difficulties of using plaster of Paris were very greatly exaggerated. He did not find any difficulty in getting plaster to set rapidly. He obtained the finest plaster of Paris supplied to dentists, whith which he mixed a small quantity of salt and warm water. The average time of setting was about two minutes. He had taken a considerable number of impressions simply by first taking a wax model; then by making a zinc plate to fit the palate to the edges of the cleft, loading that plate with plaster hot upon it and passng it into the cleft, allowing it to remain until the plaster

had simply set—not hard—and then deliberately breaking it; in that way the model of the palate was got to the line of the cleft, in which was left a mass of plaster extending back into the soft palate, and that, in many cases, could be simply pushed back into the pharynx and withdrawn with a pair of tweezers. He was sure, if any one began to use plaster, they would certainly do so in more than half their cases.

Mr. HARDING said that some three years ago he commenced using plaster, in which he took most of his models, with a very fair result. Afterwards the Lady Godiva cement was introduced, and he was sure, if it was used as carefully as plaster, and allowed to set as hard, it would be a much more pleasant thing to use. He had found warm water was the best medium to make plaster set quickly.

Mr. HEPBURN quite approved of Mr. Turner's invention, the important feature of which was that only so much of the plaster as was necessary was pressed in and no more.

Mr. HENRY thought that the best method of mixing plaster was to lightly sprinkle it with water, when the plaster would gravitate to the bottom and only take up a certain quantity.

Mr. CHARLES TOMES thought that Mr. Turner's tray seemed calculated to facilitate the use of plaster in difficult cases. If the operator would time the taking of his impressions with his watch, he would be surprised to find how long a time three minutes seemed.

Mr. TURNER, in reply, said the discussion had assumed dimensions which he never anticipated. What he wished to confine himself to was an improved method of taking plaster impressions in dentulous cases, without using bands. With a good impression in plaster a plate or a model could be made with a variety of teeth scattered all over the mouth.

Mr. CHARLES S. TOMES then read a paper entitled, "Studies upon the attachment of the Teeth," of which the following is an abridged report:—

(i.) ANCHYLOSIS.

IN the present paper I shall endeavour, while collecting and comparing some of the various facts which are already known, to at the same time relate a few new facts which have come under my own observation. Whilst engaged upon an investigation of the development of the teeth of Batrachia and Reptiles, the results of which are embodied in two papers

lately read before the Royal Society, I became aware that the ordinary descriptions of the attachment only represent imperfectly and inaccurately what really takes place. Moreover, whilst the process of "attachment by anchylosis," as it is to be found described in text-books, was an uninteresting matter enough, the phenomena which really take place are eminently suggestive, and throw light on that much more complex process, the attachment of teeth by implantation in a socket.

Although the occurrence of transitional conditions of implantation renders it impossible to refer every individual case to any one head with absolute exactness, yet, broadly speaking, three methods of attachment occur :—

(i.) Attachment by means of a dense fibrous membrane.

(ii.) Attachment by "anchylosis," or actual fusion of the tooth with the bone.

(iii.) Attachment by implantation in a socket, an organized membrane intervening between the tooth and the socket.

Of the first of these methods I have nothing to say, as I have not as yet examined any specimens in a condition suitable for microscopic study, and, as I have already said, in the present communication I propose to speak chiefly of the second, or attachment by anchylosis, which is the manner of fixation most prevalent in the classes Fish and Reptiles.

In the words of Professor Owen, the teeth of fish "are anchylosed to the jaw by continuous ossification from the base of the dental pulp, the histological transition being more or less gradual from the structure of the tooth to the bone;" whilst elsewhere, speaking of reptiles, we are told that the tooth becomes cemented to the base by an ossification of the remains of the tooth capsule.

There is, however, no general account of the process of anchylosis, so far as I am aware, which is satisfactory, or indeed really accurate. If we examine the jaws of an angle (*Lophius piscatorius*) or a wolf-fish (*Anarrhicas lupus*), which will serve our purpose well as being on a sufficiently large scale to be examined by the naked eye, we see that each tooth is perched upon a short stout pillar of bone, which exactly corresponds in size and outline with the base of the tooth which it carries.

Thus the tooth is not attached to a plane surface of the jawbone, but there is a portion of bone specially developed for its fixation; and this is a fact of no little significance when we come to take a general view of the subject. After an examination of a very large number of anchylosed teeth, I have been unable to find one single instance in which a tooth comes into position, and becomes attached to an even surface of pre-existent bone by changes in its own tooth-capsule; and the gist of my present paper is to show that, inasmuch as in anchylosis attachment takes place by a rapid and special development of *bone* in continuity with the jaw, attachment by anchylosis bears a closer relation to attachment by implantation in a socket than has been hitherto supposed.

For the purpose of description I will select the common snake, though many other reptiles would answer the purpose as well.

Looking at a transversely-divided jaw of a snake, the fusion of the tooth with the bone appears to be very complete, so that the line of union is difficult to discover, and, in point of fact, it is so intimate, that if the tooth be broken away by force, it will oftentimes take with it a portion of bone.

Examined microscopically, the bone in immediate relation with the base

of the tooth is found to be of a different and less perfect structure to that constituting the body of the jaw; the lacunæ are large and very irregular in form, and it may very fairly be called a rough and imperfect osseous structure, with which, at its upper parts, dentinal tubes blend. It is this irregular bone which at times breaks away and remains attached to the base of a tooth, and it may be conveniently designated as "bone of attachment."

I need hardly remind you that the succession of teeth in snakes is endless, new teeth continuing to be developed at the inner side of the teeth already in place throughout the lifetime of the animal. Of the time that any one tooth remains in use, it is not possible to form any estimate; but that it is probably short, is indicated by the fact that there are sometimes no less than six teeth present at one time, in different stages of preparation, to replace it.

When a tooth is about to be shed, both it and the bone at its base are attacked by absorption, this taking effect at its inner side before the outer side is at all involved; and in passing I may note that we have in these reptiles a very beautiful and complete illustration of the fact, already well established by other evidence, that absorption, although taking place in front of an advancing tooth, is wholly independent of pressure caused by it. The advancing tooth moves forward, its capsule still embracing it, and the delicate cells of its enamel organ remain *in situ*, quite undisturbed, even after absorption has been effected to such an extent that the inner side of the old tooth has been cut away, and the successional tooth has passed into the space thus gained. It is obvious, that if the successional tooth had ever come into contact with its predecessor, these cells, at the point of impact, could not have escaped destruction. The final shedding of the tooth from which the base has been thus cut away is probably, in most cases, the result of accidental violence during its use; at all events, among a very large number of sections I have never seen one where the tooth was actually detached from the bone, and was still retained *in situ* by the soft parts.

As soon as the surface of the jaw is vacated by the shed tooth, its successor, still completely enveloped in its tooth-sac, moves up to take its place; in what manner this moving of the tooth and tooth-sac is effected I am unable to see, for no special structure appears to exist for such an end. The tooth, solidly bedded in connective tissue of a loose kind,* moves through it under the influence of some unseen agency.

At the time when the tooth capsule and its contents are moving into position, the tooth having already attained its full length,† the base of the

* The Batrachia and Reptiles, as I have shown in the paper already referred to (Proc. Royal Society, December, 1874), agree with mammals in the general features of the development of their teeth. That is to say, there is never, at any time, such a thing as an open "primitive dental groove;" there are no such things as "free dental papillæ" arising from the bottom of the groove; and consequently the sinking of papillæ into a groove, and their subsequent encapsulation, as described in many places by Professor Owen, are things purely hypothetical, but which, had the views of Goodsir proved wholly accurate, might have naturally been expected to occur. The presence of an enamel organ, whether enamel be developed in such thickness as to deserve the name of a functional coat of enamel or not, is invariable in the classes of Reptiles and Batrachia, as also in Mammalia; whether it will prove equally constant in fish I cannot say, though I should be surprised were it not to do so.

† This observation bears upon the problem "in what manner do the human or other mammalian teeth become erupted?" Some authors have inclined to the be-

dentine papilla undergoes slight modification, so that the odontoblast layer is no longer confined to the long sides of the cone, but comes to extend across the wide base of the conical pulp. Thus the tooth is closed by the development of dentine more or less completely across its base, so that the completed tooth is not, as is generally supposed, a cone with its base widely open, but an entire conical shell, closed in by dentine, though less completely than a tooth with a root is. I do not mean to say that the tooth can be isolated in this condition, for the calcification of this basal layer of odontoblasts only takes place simultaneously with the formation of the bone of attachment; the existence of the basal layer of odontoblasts may, however, be readily seen, and the basal layer of dentine easily traced in sections of completed teeth.

So soon as the tooth with its capsule has reached its future position, a development of new bone takes place beneath it, upon the surface of the jaw, and progresses with very great rapidity, until it reaches the base of the dentine pulp. Here calcification goes on *pari passu* in the base of the dentine pulp, leading to the formation of the irregular basal layer of dentine, and in the tissue outside the tooth-capsule, where rough bone is formed, and thus a complete blending of the two tissues results. The share taken by the tooth-capsule is quite insignificant; it is not, in fact, traceable. Such, in outline (and the limits of my paper forbid my entering into any detail), is the nature of the process by which a tooth becomes "anchylosed," and the greater share of the work is done by tissues external to and independent of the tooth-capsule. The contiguous surface of the bone is alternately the seat of very active absorption, which has no sooner done its work, than it gives place to equally active ossification, derived apparently from the periosteum.

The portion of cementing bone, for which I have proposed the name of "bone of attachment," appears to be wholly removed with the fall of each tooth, and renewed with the advent of its successor, so that the surface of the bone, during the absence of a tooth, is covered with the characteristic depressions known as the "Lacunæ of Howship;" these become speedily filled up again by the new bone, though the traces of their presence may be discerned in good sections even when thus filled up.

Such is a typical example of "attachment by anchylosis" in its most complete form; the union is not, however, always so strong, and in many examples of anchylosis, the tooth, if broken away, separates invariably across the line of junction.

When anchylosed teeth are situated upon what appears at first sight to be a plane surface, one of two conditions will generally be found, on close examination, to obtain. Sometimes each tooth is implanted in a pit considerably larger than its own base, the interspace being filled up by "bone of attachment;" sometimes each tooth is planted upon an independent process, the interspace between the processes being sometimes filled up by a calcified but structurally imperfect bone, sometimes remain-

lief that the eruption of a tooth is due to the elongation of its root; but it has been pointed out that the distance through which the crown moves is much greater than can be accounted for by this cause; moreover, teeth with little or no root can be and often are erupted. In the case of the snake the tooth has attained to its full length, as is indicated by the occurrence of odontoblast cells across the base of the pulp, and even some calcification at the circumference, before it has reached its place upon the bone. Hence it is capable of movement in two directions, laterally and vertically, at a time when, so far as elongation goes, its growth is complete.

ing empty. The Eel tribe present excellent examples of this manner of attachment. In this figure, which is taken from a section of the jaw of the sharp-nosed eel, each tooth is seen to be attached to the apex of a hollow cylinder of bone, which corresponds pretty closely in diameter to the base of the tooth. This "bone of attachment" is of somewhat looser texture than the rest of the jaw, and the direction of its lamination is also different, being vertical instead of horizontal. The contiguous bony processes are sometimes, but not always, united by a clear calcified tissue.

When a tooth gets accidentally broken off, it separates at the line of junction, and the dentinal tubes at its base are arranged without reference to the bone, and without any disturbance in their direction, therein differing from the teeth of the Snakes, in which the fusion is more complete. But when the tooth is shed in the natural course, the bony support is invariably rapidly removed by absorption down to the general level of the surface of the jaw bone, where it is marked by the lacunæ of Howship.*

From the teeth of the Eel we may pass to the Haddock.

The teeth of the gadoid fishes (Cod tribe) present a remarkable uniformity in their disposition and manner of attachment; the fish from which the figures are taken is the Haddock, it having happened that I have more sections of the teeth of that fish than of any other gadoid, though any other would have answered the purpose equally well. The short supporting cylinder of bone upon which the teeth are planted is hollow, as in the Eel, its central cavity being continuous with the pulp-cavity of the tooth upon it.

The latter is not simply planted upon the flat end of the cylinder, but has, close to its base, a shoulder, which fits upon the top of the hollow cylinder of bone, while the tooth is continued for a short distance further within the central concavity of the bony support.

We have thus, for the first time, something approaching to a socket, and it will be worth while to examine somewhat more closely into the manner of its development, inasmuch as it is in a measure an intermediate stage between anchylosed and socketed implantation.

As in almost all fish, the succession of the teeth is very rapid, and countless numbers are developed; so that there is no difficulty in finding examples of every stage, even amongst a few sections.

A completed tooth, viewed with the naked eye, appears to rise abruptly from the bone, which presents a level surface; but when it is viewed in section, this appearance is found to be in some degree deceptive. For, in point of fact, that portion which arises directly from the surface of the bone is not tooth, but bone; the tooth stands upon the top of a hollow cylinder or column of bone, which is just the same size as the base of the tooth. The tooth itself, although abruptly contracted near its base, so

* The enamel points upon these teeth recall those he sıslo ffot carboniferous teeth described by Professor Owen as "Ganacrodus," a new genus (Odontal. Transac., vol. v. 1866), of which he says, "I had not before met with any similar structure in the whole range of my odontological researchse." The teeth referred to this new genus "Ganacrodus" turn out to belong to Palæoniscus or its allies, of which at least five are known to have teeth thus capped, and had been described years before in as well-known a work as Agassiz's "Poissons Fossiles" (see Month. Review Dent. Surg., Nov. 1874), and the occurrence of these slight enamel tips is by no means so uncommon as Professor Owen supposes. Thus the Newts and the Salamanders possess similar tips, in their case bifurcated (see Proc. Roy. Soc. Dec. 1874), while in the class of fish there are many instances to be met with. They are easily lost in making sections.

that a shoulder is formed which rests upon the top of the bony column, while its terminal portion, of smaller diameter, fits within the hollow interior of the column, remains widely open nevertheless at its base, which does not appear to have any tendency to contract, so as to bear any close resemblance to a root; in fact, it penetrates the interior of the hollow only for a very short distance.

Whether actual anchylosis takes place I am not sure, but the surfaces are very closely adapted to one another. Thus we have what may be termed a rudimentary socket formed, and the manner of its formation is a matter of no little interest.

When the tooth is shed, the whole tooth-pillar is swept away, so that if it were possible the whole series of teeth happened to be shed at one and the same time, the surface of the jaw would for the time present a perfectly plane surface. In other words, the bone above the general level of the surface of the jaw is built up specially for and around each tooth; it is "bone of attachment," in the same sense, and just as strictly, as that to which we have applied the term in reptiles.

The development of the basal end of the tooth and of this bone go on *pari passu;* and each individual tooth becomes attached to the bone of the jaw by a new development of bone, specially for itself, by which it comes to have an attachment which is eminently suggestive of a socketed implantation. The new bone arises from the surface of the jawbone, immediately beneath the tooth; little processes of bone shoot up, coalesce with one another, and form a bony framework around the base of the tooth-pulp at the same time that this is abruptly contracting and forming that portion of dentine which pasess within the bone. The structure of the bone is, however, more similar to dentine than that of the Eel; it is, as bone, less perfect, and also, as far as one can judge, more rapidly formed.

The forms of anchylosis which have been briefly reviewed, and which may be taken as fairly representative of the other modifications, have one striking character in common, to which, if it has been observed at all, attention has not hitherto been called.

This is, that in every instance, even where it is at first sight inconspicuous, attachment takes place through the medium of new bone, specially developed for that end. In no case whatever, so far as I know, is a tooth attached to the old bone by that simple process of ossification of its capsule or what not, as is described in text-books.

And the interest attaching to this observation is much enhanced when we recall that John Hunter believed in the entire dependence of the socket upon the teeth; a matter which, indicated by him, was demonstrated to full proof by the laborious investigations of my father upon the formation of the socket of the teeth in man. The dictum, insisted upon over and over again by my father, that a tooth coming into place does not come into a socket ready prepared for it, nor use the socket of the tooth displaced, but that its own socket is moulded around itself when and where it happens to come, receives a new force when we find that an analogy so close exists in the process even in the anchylosed teeth of fish and reptiles.

And surely, when we return again to the study of the development of the sockets of mammalia teeth, a matter which is of actual import in influencing our practice, we shall do so with a clearer light to guide us, in that we know that, in the attachment of a tooth by anchylosis in its simplicity, or by ever so rudimentary a socket, the bone is modelled to the

tooth, in full subserviency to the position of that tooth, and that the tooth does not come to take its place upon a spot predetermined for it by a disposition of the bone made prior to its advent.

In reply to some observations and questions as to the relation of the structures to the teeth,

Mr. TOMES said, the thing which more than anything else settled in his mind whether those structures were to be regarded as osteo-dentine or as bone proper, was that the limits of the tooth capsule were perfectly discernable at a period when the bone of attachment was beginning to be formed. The tooth, as explained in the paper, went to its place capsule and all. The bone of attachment was formed most distinctly outside the tooth capsule in the case of the snake. The tooth pulp in the case of a haddock, ends a little below the junction with the bone. It dipped down only a little way, and not by any means, all the way into the bony supports. In the eel, the tooth capsule descended a very little way within the hollow column of bone. He was of opinion that the dentinal part of the tooth was distinctly dermal, and that the enamel was distinctly epidermic. He did not agree with one of the speakers who said the absorption took place solely at the point of contact. No doubt he (Mr. Tomes) had noticed a good many temporary teeth where the main absorption was at the point towards which the permanent tooth was coming, but spots of absorption might generally be detected which were quite independent of this, and sometimes they would be found to come on the opposite side. In conclusion, Mr. Tomes thanked the members for the interest they had shewn in his paper.

Votes of thanks were tendered to the various gentlemen who had made casual communications, and to Mr. Tomes for his able and interesting paper.

Mr. C. J. White and Mr. Robert Hepburn were appointed auditors of the accounts for the general meeting.

The CHAIRMAN said he had the pleasure to announce that the President was so much better that there were hopes of his being able to preside at the next meeting.

It was intimated that the Annual General Meeting would be held on the Second Monday in January.

Central Society of German Dentists.

The Thirteenth Annual Meeting of the Central Society of German Dentists was held in Cassel on the 3rd, 4th, and 5th of August. The following papers were read:—

1. Upon the application of rubber for the restoration of the upper jaw and palate, as well as its general uses in Dentistry. By Carl Zimmer, Court Dentist in Cassel.
2. Upon the artificial production of caries, and the effect of wine upon the teeth. By M. Schlenker, St. Gallen.
3. Upon so-called scorbutic affection of the gums. By. Dr. Scheff, Vienna.
4. Upon Nitrous Oxide gas. By Dr. Ostermann, Brunswick.
5. Upon the practical treatment of exposed and inflamed pulp. By Dr. Adolphe Witsel.

(A stopping recommended by Dr. Witsel is now prepared and sold by Mr. C. A. Larenz, of Leipzig, it is called "Carbol-cement.")

Full reports of the above mentioned papers may be found in the current number of the *Deutsche Vieteljahrsschrift*.

In the course of the three days' meeting, a number of interesting subjects were discussed. The meeting was attended by about 100 dentists, many of whom came from Austria and Switzerland.

MEDICAL SOCIETY OF LONDON.

The proceedings on the 16th inst. (Mr. Victor de Méric in the chair) opened by the President reading a letter from the widow of the late Dr. Anstie thanking the Fellows of the Society for their sympathy in her sad loss.

A paper, entitled "Something New (or supposed to be so) in Dental Surgery," was read by Mr. Napier. The author related a case lately under his care, in which the teeth in both jaws being reduced by mercurial salivation and other causes to the condition of sharp jagged spikes, productive of much suffering and discomfort, and anæsthesia in any shape being objected to, he had employed an original form of treatment, giving rise to no pain. The process of filing having been satisfactorily accomplished by means of the ether-spray locally applied, he cautiously and very gently touched the exposed portion of the nerve of each tooth successively with a pencil of hickory-wood dipped in nitric acid, by which simple method it was rendered insensate, and the mouth prepared for the reception

of artificial substitutes. Mr. Napier was anxious that the principle involved should receive a fair share of attention, as he held the present system of nerve-demolition to be at variance with true science, and concluded his paper by expressing his conviction that the whole profession would be much benefited if dentistry were made part of the curriculum of every student, and studied, not as a specialty, but in a fitting and well-organised department of every general hospital. The paper did not provoke a very lengthy discussion; however, after Dr. Crisp and Dr. R. J. Lee had made a few remarks, Mr. Sewell said he did not agree with the author's preliminary remarks, and thought the paper ought to have been brought before the Odontological Society. He would have imagined the application of nitric acid in this case to have produced exquisite suffering. Mr. Napier briefly responded. The president then remarked, that as dentists were admitted as fellows of the Society, their papers would always be received with pleasure; and the fellows present testified their approval of this sentiment. —*Lancet.*

ZOOLOGY.

(Science Review.)

Examination of Teeth of Cestracions.—Professor Agassiz says, in the last paper he wrote, which was one only recently printed by the "American Naturalist," "Let me here say that from single specimens of Cestracions, obtained in different parts of the world, have been indicated three supposed genera based on the conditions of the teeth at different periods of age. To show that this should not be accepted as an unquestionable result, let me say that I have examined the young of the three supposed genera. They are all provided with keeled molar teeth, while the adults have the flat grinders supposed to be characteristic of the Cestracion type alone. I am therefore satisfied that it is worth while to collect largely and preserve a number of specimens, even if they be sharks and skates and occupy a great deal of room, in order to learn their history, which has just shown of what importance has been the indentification of teeth among fossils. Thus sharks drop their teeth, and scatter them along the bed of the ocean in great numbers, probably ten or twenty times as many as they have at one time while living, so that it is not to be wondered at that we frequently find in collections of fossils, loose teeth of sharks and that we so rarely find the jaws of sharks with teeth in their places. Of course in those species in which the teeth are isolated and do not support one another, we should hardly ever expect to find them fossil in position; while those which are pressed upon one another may be found in the fossil state, and that occurs again and again, and among the fossil fishes there are a number of sharks in which jaws with teeth arranged in rows are represented."

LONDON DENTAL HOSPITAL.

CASES TREATED FROM NOVEMBER 1ST TO NOVEMBER 30TH, 1874.

Extractions. Children under 14	326
Adults	487
Under Nitrous Oxide	298
Gold Stoppings	172
White Foil ditto	79
Plastic ditto	145
Irregularities of the Teeth treated surgically and mechanically	47
Miscellaneous Cases	237
Advice Cases	46
Total	1837

DAVID HEPBURN, *House Surgeon.*

The following Publications have been Received:—

The Dental Register.
Johnston's Dental Miscellany.
Le Progrès Dentaire.
Le Progrès Médicale.
The Dental Cosmos.
The Pennsylvania Journal of Dental Science.
The Missouri Dental Journal.
Deutsche Vierteljahrsschrift.
Transactions of the Odontological Society.
Salter's Dental Surgery and Pathology.
Correspondenz Blatt.
Boston Journal of Chemistry.
The induction of sleep and insensibility to pain. By John M. Crombie, M.A., M.D.
Instructions in Vulcanite. By E. Wildman, M.D., D.D.S.
The Dental Advertiser.
The London Medical Record.

[We are compelled from pressure on our space this month to postpone Mr. Barkas's article on "Fossil Teeth," as well as other communications.]

TO CORRESPONDENTS.

ALL communications intended for the Editor should be addressed to the care of Messrs. SMITH, ELDER & Co., 15, Waterloo Place, Pall Mall.

All inquiries respecting Advertisements and Subscriptions should be sent to Mr. GEORGE BUTCHER, 4, Crane Court, Fleet Street, E.C.

THE MONTHLY REVIEW
OF
DENTAL SURGERY.

No. VIII. JANUARY, 1875. Vol. III.

THE PAST YEAR.

The first event of the year in the Dental world was the Meeting of the Odontological Society: as much general business has to be transacted at this Meeting there was only time for a few casual communications. One of these has now a melancholy interest attached to it, as being from the late Dr. Thomas Hitchcock, of Boston. Mr. E. Sercombe, was elected President; and the Treasurer's Report stated that revenue had exceeded expenses by £100. The business of the Society has gone on through the year in the usual way, and during the illness of Mr. Sercombe, Vice-President Vasey discharged the duties of the office most efficiently. The papers read during the year, were on, "A New Method of Manipulating Vulcanite," by Mr. C. Williams, L.D.S. On "Dr. Kingsley's New Method of making Soft Rubber Obturators," by Mr. J. S. Turner, M.R.C.S. On "Transplanting and Replacing Teeth," by C. Spence Bate, F.R.S. On "Dentigerous Tumours of the Jaw," by Mr. Bryant, F.R.C.S. "The Condition of the Mouth and Teeth during Pregnancy," by Oakley Coles. And "Studies on the Attachment of Teeth," by Mr. C. Tomes, M.A., M.R.C.S., &c. The

casual communications throughout the year were of a varied and interesting character, altogether the volume of transactions for 1874 will bear a favourable contrast with its predecesors. The March Meeting is memorable as having been held in the Society's new Meeting room. Mr. Sercombe delivered his inaugural address, and held a conversazione, which was honoured by the presence of about 400 persons, including many of the Medical and Surgical celebrities of London.

The removal of the Dental Hospital from Soho Square to the new premises in Leicester Square, was made the occasion of a great gathering of Dentists from all parts of the country, and the event was celebrated by a dinner in Willis's Rooms, which was attended by about 200 professional gentlemen. The President of the Royal College of Surgeons was in the chair, and several eminent representatives of medicine and Surgery were present.

The removal of the Dental Hospital gave rise to some speculations as to the eligibility of the site, and the influence it might have on the attendance of patients. Like all changes, however favourable they may appear, this had the usual element of uncertainty about it, but the results seem to have justified the most sanguine anticipations of its promoters. At first, there was a slight falling off of patients, but they soon found their way to the new quarters, and the work done has been most satisfactory, both in quantity and quality.

The total number of patients attended to during the last year is 17,580. There were 12,303 cases of extraction, of which, 2,354 were performed under the influence of the Nitrous Oxide gas. The stoppings numbered 3,429, of which, 1,219 were in gold, 166 in tinfoil, and the rest in plastic materials. The remaining cases were irregularities and diseases of the mouth. The present number of enrolled students is 66. The system of payment for gold used in stoppings has been lately enforced, and we await with interest the Annual Report of the Hospital to give us some information on the effect of the change. From all we can learn it has worked satisfactorily. Altogether the changes of the year seem to have worked well. The press showed its interest in the matter, by sending special reporters to examine the Hospital, and the accounts both in the general and medical papers were highly laudatory.

The *Saturday Review* had an eccentric article on Dentistry, which seems to have been taken up seriously by some of the journals both at home and abroad. Like many other articles in that periodical it was intended rather as a garnish to heavier reading, than to "point a moral," or establish a principle. It was on the whole, a clever, good-natured sketch of the feelings of a patient towards his dentist, and as such, was accepted and laughed at by the majority of the profession and the reading public.

The bygone year has witnessed an attempt to establish a Dental School in connexion with a general hospital in London, but we have no information as to the success of the movement.

By a vote of the Council of the Royal College of Sugeons, this examining body has opened its doors to members of the Dental profession who had been in practice, or commenced their education previous to 1859—the year of the establishment of the Dental Diploma. In connection with this great boon to the profession, we must not forget the efforts of Mr. C. J. Fox, to whose persevering exertions the origin of the movement is mainly due.

The distribution of prizes to the pupils of the London School of Dental Surgery, was made an occasion for a numerous gathering of the friends of the Institution. The address from the Chair, delivered by Mr. Savory, will long be remembered by those who heard it, as a specimen of scholarly eloquence. To the exertions of the Dean of the School, Mr. T. A. Rogers, this gathering was due, and its success must have been very gratifying to him after his hard work. The prizes attached to the Institution are assuming a satisfactory degree of importance. The testimonial to Mr. E. Saunders, in acknowledgement of his exertions in behalf of the Dental Hospital, is, by his desire, to assume the form of a Scholarship. The Dean has offered a prize for the most successful cases of treatment of exposed tooth pulp, and several other gentlemen have made offers which the Committee hope to be able to utilize, so that beyond the prizes given by the Lecturers, there will be other direct stimulants to industry and ingenuity.

The literature of the year has been interesting and instructive. Mr. Clover's papers "On the Production of Sleep during Surgical Operations." Mr. Mason's "Surgery of the Mouth." Mr. Barkas' "Researches on the Micro-

scopical Structure of Teeth." Paul Broca's papers on "Odontomes," and Mr. Salter's "Dental Surgery," are all subjects of interest to the dentist, and their treatment by these gentlemen is of the highest order.

Mr. Fletcher's startling experiments on Cohesive Gold, followed by his sudden change of front, have had the effect of producing a vast amount of instructive discussion, which is still going on both here and in America.

The articles by Dr. Bogue, M.D., of New York, Mr. Fletcher, and others, on the subject of Amalgams, are excellent corollaries to the experiments conducted by Mr. Tomes a few years ago, and direct the attention of the profession to the necessity of a more careful manipulation of these materials if good results are to be derived from their use.

The novelties of the year have not been very numerous. The use of the Lacto-phosphate of Lime for exposed pulps, introduced in America, has been attracting a fair share of attention, and some good results from its use are reported. Mr. Moon's Splint for fractured inferior maxilla has been highly spoken of; and Mr. Hammond's Intra-Dental Splint, used during the Franco-German war, has been much admired for its simplicity and ingenuity. This gentleman has also introduced thin sheets of Carbolized Cork which give good results in nerve capping. Mr. Brunton has now perfected his contour flask by providing guides for directing the plug into its position when it is being screwed up after packing. Mr. Braine has introduced an ingenious arrangement for carrying the metal bottle containing compressed Nitrous-Oxide, whereby the operator can supply his bag by a simple pressure of his foot without withdrawing his attention from the patient. Professor Oré, of Bordeaux, has produced Sustained Anæsthesia by the injection of Chloral into the veins of the patient, operation and recovery being satisfactory in every way. America as usual, has sent us her contributions of ingenious contrivances. A New Burring Engine and improvements in the original one. A set of jack-screws for regulating work is well worthy of attention. By them the difficulty of expanding a contracted alveolar arch is reduced to the minimum. Gillespie's Rubber Disk for suction plates, is an invention which does not recommend itself to favour. It appears at first sight as if the plate

might be held up by suction in the centre, but otherwise might be unsteady. This view is strengthened by the statement that the instrument can be attached to old plates and produce adhesion. Still, several who have tried it speak highly of its utility. Mr. Turner, of London, has suggested a novel way of taking plaster impressions, and introduced a new form of tray for that purpose. The system has the merit of novelty and originality. The author considers his ideas as only suggestive, and looks for great improvements on the crude conception. He professes himself satisfied with the results so far as he has gone, but says, that like everything else, it requires the experience which can only come from practice.

We have this year had numerous visitors from America. Unfortunately these gentlemen come here in the dull season, when many of us are away. Still, if a Reception Committee could be organized, as has been already suggested, we might be able to see and hear more of them, and they of us, and so would the bonds of unity between us be strengthened.

The Obituary of the year, records the death of several men of importance. Francis Webb, M.D., Editor of the *Medical Times and Gazette*, was known to us as the Author of the "Teeth in Man, and in the Anthropoid Apes," and of an Essay "On the Teeth in the Varieties of Man," and in conjunction with the late Mr. Hulme, he edited an edition of "Hunter on the Teeth." Mr. Sheffield, brother of the late President of the Odontological Society, also passed away. Dr. T. Hitchcock, M.D., Dean of the Harvard Dental College, will long be remembered by many who knew him in this country. His contributions to Dental Literature, and his interest in Dental Education, shew his worth, and we must regret him here as one of ourselves. The year closed sadly in America, by the death of Dr. E. Parmley, of New York, one of the oldest Dental Practitioners in the world. The New York Odontological Society, then in session, joined in the last sad offices of respect to this Veteran Practitioner.

THE MONTH.

The New President of the Odontological Society.

The profession will hear with satisfaction that Mr. Tomes, F.R.S., has been unanimously elected President of the Odontological Society for the year 1875. It is of the greatest moment at the present time, that the leading members of our profession should in turn occupy the most prominent position that can be held, and assuredly that of President of the Odontological Society is of paramount importance. In choosing Mr. Tomes (for the second time), the Odontological Society has conferred the greatest honour it can, upon the most distinguished member of the Dental profession in this country.

The initatiion of the movement that has led to the Second Election of an old president is due to Mr. Charles Vasey, and the profession cannot but feel how much this gentleman has done in promoting an important reform, and still further in foregoing an honour to which he was himself most justly entitled.

Royal College of Surgeons of England.

Examination for Diploma in Dental Surgery.

January 8, 1875, 2 to 4 o'clock, P.M.

N.B.—The Candidate is required to answer at least one of the two questions both on Anatomy and Physiology, and on Pathology and Surgery.

Anatomy and Physiology.

1. Describe the attachments of the Buccinator Muscle, how it is engaged in Mastication, and whence it derives its vascular and nervous supply.

2. From what sources is the fluid in the Mouth derived? State the principal causes which influence the amount formed, and explain how those causes act.

Pathology and Surgery.

1. Describe the origin and development of a cyst in the lower Jaw. How would you distinguish it from other tumours in this region? and what does it usually contain? and state how you would treat it.

2. Describe the treatment you would adopt in continued hæmorrhage after excision of a portion of a Tonsil.

Dental Anatomy and Physiology and Dental Surgery.

January 8, 1875, 5 to 8 o'clock, P.M.

N.B.—The Candidate is required to answer at least two out of the three questions, both on Dental Anatomy and Physiology, and on Dental Surgery.

Dental Anatomy and Physiology.

1. Explain fully the different theories concerning the formation of

Dentine, especially in relation to the tubuli. Of what do their contents consist? and how may they be pathologically affected by disease?

2. State the ages at which the eruptions of the deciduous and permanent sets of teeth commence, and the ages at which they are respectively completed; describe the characters by which you would distinguish between the first and second Molars of the deciduous set, and between the first and second Lower Molars of the permanent set.

3. Explain the several circumstances which conduce to the protrusion of the chin and the shortening of the face in old people; and describe the ways in which artificial teeth rectify such conditions.

Dental Surgery and Pathology.

1. Draw a distinction between toothache arising from diseased conditions of the teeth and pain in teeth arising from constitutional causes: name the constitutional conditions and diseases which principally affect the teeth.

2. Describe the conditions under which certain of the permanent teeth in the adult may be wanting from the mouth when none have been extracted. Point out the particular teeth most frequently absent, and state the circumstances which probably explain such deficiencies.

3 What are the different varieties of united teeth, and the nature of the union? State the probable causes of such union between contiguous teeth, and the consequences to which that condition may lead.

Dental Examination.

The following gentlemen having successfully passed the written and *viva-voce* examinations held at the College on the 8th and 15th of this month, were duly admitted Licentiates in Dental Surgery of the Royal College of Surgeons.

Fifteen candidates presented themselves for examination, but of this number six were referred back to their studies for six months.

J. O. Atkinson, Esq., Kendal.
H. M. Baylis, Esq., Islington.
A. Cartwright, Esq., M.R.C.S., Old Burlington Street.
H. B. Gill, Esq., Bow, E.
C. J. Hallis, Esq., Pau.
W. F. Henry, Esq., Cornhill, E.C.
G R. Keeling, Esq., Epsom.
G. T. Silvester, Esq., Croydon.
D. Watson, Esq., Torquay.

The Next Dental Examination.

We believe there will be another Examination for the Dental Diploma in the course of the next two or three months. The time, however, will depend upon the number of candidates sending in applications for admission to the Examination.

Poisoning from Vulcanite.

We reprint at another part of the *Review* an important article by Dr. Bathurst Woodman (first published in the *Medical Press and Circular)*, on "Chronic Mercurial Poisoning from Vulcanite."

Dr. Woodman brings forward an amount of evidence as to the poisonous action of coloured vulcanite when used as a dental base, that cannot but call forth the gravest consideration on the part of the entire profession. Dr. Woodman is too well known as a careful observer for his statements to be lightly esteemed, at the same time it is possible that the symptoms (pronounced as they were) may admit of a different interpretation.

Death of a Dental Patient from Chloroform.

A death recently took place in Boston, U.S , from Chloroform administered for a dental operation. It was stated in evidence at the Coroner's inquest that the lungs were affected, but, the jury passed a verdict that death was directly due to the inhalation of Chloroform, and recommended that the Legislature should prohibit its use as an Anæsthetic until more precise knowledge was possessed as to its action.

NEW INVENTIONS.

Mr. Stewart's Improved Reflector.

One of the most seasonable novelties introduced during the past month, has been an "Improved Reflector," for working by gas light, on dark and foggy days, or at night; it is the invention of Mr. Stewart, F.R.C S.E., and is certainly most simple and efficient.

The Reflector is made to slide on the Stand—five feet in height—and can be raised or lowered with the greatest ease; and a lateral movement, by which the light is directed as required, is affected almost instantaneously. The position of the Reflector, however, does not require to be changed with every movement of the patient, as not only the mouth, but the whole face, and even the upper part of the chair are illuminated. From our own experience, we can heartily recommend this invention to all those practitioners living in large cities, or narrow thoroughfares, where the light is often bad, and sometimes entirely insufficient for dental operations.

Even country practitioners who rejoice in the full measure of daylight that visits our island, will find this Apparatus most serviceable for night work.

Davis's Gold Amalgam.

This Amalgam posseses the merits claimed for it by the Inventor. It sets so hard in ten minutes that it can be burnished thoroughly. The colour is good and the texture is even. Whether the excellent colour it possesses will be retained, time alone can determine. If the colour is as good a year after the Amalgam is put in as it is when first applied, Mr. Davis will have achieved a success that has not hitherto been attained in the preparation of Amalgam stoppings.

ON A CARIOUS TOOTH.

By W. J. BARKAS, M.R.C.S.E., L.R.C.P. Lond.

Part I.

STRUCTURE OF THE HEALTHY TISSUES.

(*Continued from page* 309.)

DENTINE.

Dentine, as I mentioned in my last paper, is an essential ingredient of all teeth, but it is not found in teeth only, because we observe structures in the spinous tubercles that are implanted in the skin of several rays and sharks, in most of the fish spines or fin defences, and in some varieties of fish-bone, that cannot be distinguished in any of their characters from dentine so-called, that is, tooth-dentine, when they have attained their fullest stage of development. Whether these structures are also alike in their modes of growth, I have not had the opportunity of testing as yet. With this part of the question, however, we have nothing to do in these papers, my researches being confined to the minute structure of fully developed tooth-dentine, and for the present to healthy fully developed tooth-dentine.

In describing this tissue I shall adopt the same plan as I employed in pourtraying the histological characters of the enamel; first, giving Professor Owen's description, and as much as possible in his own words; second, Mr. Tomes', at least, I shall only refer to those points wherein he differs from the account of Professor Owen, because I wish to avoid repetition as much as possible; third, Mr. Salters'; and finally I shall add any results I may have obtained from my independent examination into this structure.

Professor Owen in his "Odontography" enters very minutely into the microscopical characters of this tissue; he also gives therein an historical account of the gradual manner in which the nature of the component parts of the dentine was discovered. This book, however, was published some years before Mr. Tomes' work, embodying his supposed discoveries, was issued; it may be thought, therefore, that Mr. Tomes' researches supersede those of Professor Owen, but the Professor himself does not appear to think so, because I notice that in his "Comparative Anatomy and Physiology of Vertebrates," published in

1866, he still adheres to the doctrines he enunciated in his former work. If it is fair to judge from this indirect evidence, that Professor Owen and Mr. Tomes do not agree in some very essential points even at the present day, we may safely conclude that one or the other is wrong in his deductions from the facts, and that it is not presumptuous for another microscopist to step into the field and attempt as well as he can, consistently with the facts, to settle the points in dispute. Mr. Salter also differs from Mr. Tomes in very marked particulars concerning this tissue, but his account of the structure agrees in the main with that of Professor Owen.

As Professor Owen's description was among the first to appear, and as the structure was named "dentine" by him, I shall give his account of the characters somewhat in detail. This will not be a waste of time, because his sketch is remarkably exact in most particulars; we will, therefore, not be necessitated to repeat anything that is not disputed, and it will lay the foundation for indicating wherein these authors differ in opinion.

"Dentine consists of an organized animal basis, disposed in the form of extremely minute tubes and cells and of earthy particles; these particles having a two-fold arrangement, being either blended with the animal matter of the interspaces and parietes of the tubes and cells, or are contained in a minutely and irregularly granular state in their cavities. * * * The tubules and cells contain, besides the granular matter, a colourless fluid, probably transuded 'plasma,' or 'liquor sanguinis.' * * * Cruorine extravasated during intense inflammation of the pulp, or by an over-distension of the vessels, produced mechanically as in hanging or drowning, would in like manner be carried, with the plasma, into the dentinal tubes, and occasion red spots in the tooth substance; the bile-stained serum, in the case of jaundice, would equally affect the capillary tissue of the tooth with its peculiar tinge; but it does not follow that the tubes which imbibe such coloured fluids must necessarily be capillary blood-vessels." The tubules measure one-ten thousandth of an inch in diameter at their origin at the peripheral surface of the pulp cavity, from thence "they radiate to the external surface of the dentine with a general direction vertical to the surface; those arising from the middle of the summit of the pulp cavity

ascend vertically to the enamel-covered surface of the dentine at the summit of the crown; the tubes on each side of these gradually incline outwards; those which go to the angles of the crown forming an angle of 45° with the middle vertical tubes. At the sides of the crown the tubes incline still more outwards until in the middle of the fang they become horizontal, and still lower, bend downwards. The vertical tubes are nearly straight, but as soon as they begin to incline from the perpendicular they become bent into two or, more commonly, three gentle wavy curves; at the sides of the crown, and along the upper half of the fang, the tubes form a short bend concave towards the crown, then a longer bend in the opposite, and finally a third bend in the first direction; the general curve being concave downwards; in the lower half of the fang the first curvature with the concavity upwards is the principal one. These 'primary curves' are on the same plane, or nearly so. (Most of these characters are pourtrayed in Fig. I. of my first paper, which appeared in the December number of the "Review"). The 'secondary curves,' of which 200 may be counted in an extent of one-tenth of an inch of the length of a tube, are not on the same plane, but form slight gyrations through the whole course of the tube. (Fig. VII., which will appear in the plate accompanying my next paper, shews portions of two tubes, the shorter portion measuring one-five hundredth of an inch in length, and in it there are 14 gyrations or secondary curves). Both the primary and secondary curves of adjacent tubules are parallel; and occasionally the tubes make a short bend along a line parallel with the outer contour of the crown, giving rise to the appearance which may be called 'contour lines;' the parallelism of the entire tubes being affected only by the amount of their divergence in radiating from the pulp cavity. * * * Thin sections of dentine taken across the tubes, viewed by transmitted light with a 500 times linear magnifying power, shew the clear area of a tube more or less occupied by a dark sub-granular opake calcareous substance, and a clear border to the area, neatly defined from the intertubular substance, and indicating the proper parietes of the tube. The addition of dilute muriatic acid dissolves the opake contents of the tube, and clears the whole circular area. It dissolves at the same time the

finer particles of lime in combination with the animal basis of the intertubular substance and parietes of the tubes, which latter then cease to be distinguishable. This shews that either the lime particles have a peculiar arrangement in the parietes of the tubes, or are more abundant there than in the intermediate substance, since the parietes can be distinguishable only while those particles are present. The appearance can scarcely be an optical deception, because the thickness of the parietes of the dentinal tubes, in relation to their area, varies in different animals. * * * In viewing the dentinal tubes lengthwise, a third is usually more faintly seen in the interspace of any two that are in focus; it is on a different plane, and the tubes on different planes are commonly alternate in position; viewed in transverse section, their arrangement appears quincuncial, yet not regularly so throughout; so viewed, the distance between two tubules does not exceed, and often does not equal, the width of one, its parietes and lumen being included. The distance between two tubules viewed longitudinally on the same plane is generally equal to the width of two; but if the distance between the opake area of two parallel tubes be estimated, irrespective of the proper tunics of the tubes, it more than equals the width of three such opake areæ." The latter mode of calculation "is inexact in reference to the actual distance between the tunics of the dentinal tubes. The true distance is nearly the same throughout the course of the tubes, for, as they diverge, they divide and subdivide dichotomously, maintaining the same diameter to within one-fourth or one-fifth of their terminations. * * * The tubes also send off into the intertubular space very minute branches which divide, and passing into the next interspace, are lost there, anastomosing, or terminating in the calcigerous or dentinal cells. The lateral ramuli are more numerous in the fang than in the crown; here the finer branches are most abundant at the peripheral extremities of the tubes, which frequently appear to end abruptly, as if truncated; sometimes dividing and subdividing quickly; the terminal branches diverge widely, and appear to end in the stratum of fine cells which divides the dentine and enamel: here and there I have seen a tube bending back to form an anastomotic loop with an adjoining tube. The peripheral stratum of minute cells receiving the terminal ramifica-

tions of the dentinal tubes, and forming the boundary between the dentine and the enamel, is the most sensitive part of the dentine. * * * M. Duval, who has well described the vital properties of this part of the dentine, and rightly states it to be the seat of the commencement of caries, has proposed to call it 'dictyodonte.' * * * The dentinal cells of the human tooth are sub-circular, about one three-thousandth of an inch in diameter; they seem most numerous, from being most conspicuous, near the periphery of the dentine. The true dentinal or calcigerous cells include many tubes and intertubular spaces, and it is more exact to say that these cells include a tubular structure, than that the intertubular space is cellular. The unprejudiced microscopical observer will find the tissue in the intervals of these dentinal tubes, for the most part, clear and structureless." He further adds, in his work on the "Comparative Anatomy and Physiology of Vertebrates," that processes of the formative pulp pass into the dentinal tubes. Such are the characters of this tissue as pourtrayed by Professor Owen in words; in the Atlas accompanying the "Odontography," Plates 122 and 122A, he illustrates his descriptions.

Mr. Tomes, in his "Dental Surgery," appears to agree for the most part, with Professor Owen as to the characters of this tissue; but there are a few points, and very essential points too, in which he differs. He says, "the dentinal tubules by the anastomosis of their branches become connected with each other * * *; in the crown of the tooth they terminate by forming loops, or pass into the enamel and are there lost * * *. In teeth, the dentine of which is imperfectly developed, the terminal branches are lost among, or end in, the minute cavities which abound in contour lines at or near the peripheral surface of the dentine. * * * In sections which have been dried, the tubes become very distinct—we may sometimes on adding a coloured fluid to the preparation when under the microscope, observe the tubes becoming gradually filled. The foregoing conditions of the dentinal tubules were so easily demonstrated and appeared to indicate so satisfactorily the offices of these canals, that the subject was regarded as one which had been fully investigated." He then tries to show that the tubes are not hollow vessels carrying plasma during life, by adducing certain physiological phenomena; but with these pheno-

mena we have nothing to do in these papers, because the mere fact that phenomena, physiological or otherwise, occur that do not apparently accord with past microscopical discoveries is no proof that the discoveries were wrong, but rather points to the idea that we have still something to find out concerning the cause of the phenomena. We will therefore pass on to Mr. Tomes' microscopical proof that the tubules are not hollow. "With proper care in manipulating, nothing is more easy than to demonstrate the existence of the dentinal fibrils in any tooth that has been recently extracted. If a thin section be made in a plane parallel with the direction of the tubes and then placed in dilute hydrochloric acid until the whole or a greater portion of the lime is removed, and the section be afterwards torn in a direction transverse to that of tubes, many of the fibrils will be seen projecting from the torn edges. * * * If a section be taken in which the tubes are extended into the enamel, and submitted to the action of acid, it will be found that after the latter tissue has been dissolved, fibrils will remain connected with the dentine at those points where the tubes penetrated the superjacent structure. It is not necessary, however, to decalcify dentine in order to show the fibrils. If a similar section to that already described be divided with the edge of a knife, many of these delicate organs will be seen, but they are usually broken off much shorter, many of them scarcely projecting beyond the orifices of the tubes." He next proceeds to show that these fibrils are connected with or enter into, the pulp. The appearance of these fibrils under the microscope leads Mr. Tomes to consider that they are "composed of an almost structureless tissue, transparent and of a comparatively low refractive power," and therefore almost invisible in glycerine; cylindrical in shape; he is doubtful whether the fibrils are tubular or solid, but he thinks it may be assumed "that a fibril consists of a sheath containing a semi-fluid matter, similar to the white fibrillœ of nerves; but whether such a conclusion can be justified admits of doubt." One more point wherein Mr. Tomes differs from Professor Owen, and I am done with his description; he evidently does not believe in the dentinal cells of the latter odontologist, for in his account of the development of the dentine, he attempts to prove that each tubule is formed from a cell, or perhaps from a series of

cells, superimposed one above the other, the wall of which cell or cells ultimately become the calcified tube-walls, and in a healthy tooth cannot be distinguished from the intermediate tissue. With regard to that peculiar appearance found in some teeth, and named "globular" dentine, he inclines to believe that there are two conditions. "In the one the globules are very distinctly marked by the imperfect tissue, which fills up the interglobular spaces, or by the absence of tissue in those intervals. In the other condition, the part corresponding to the interglobular spaces is occupied by dense tissue, which gives uninterrupted passage to the dentinal tubes, but at the same time presents an appearance of great solidity, and is bounded by a very definite outline. This state I have compared to calcified areolar tissue," and he distinguishes it by the name of "areolar" dentine.

Mr. Salter's description of dentine in his new book, on "Dental Pathology and Surgery," I have had the opportunity of reading, since my M.S. was prepared for the press. I find that he forestalls one or two of the remarks that I have made, but I shall not alter my paper in any way, because, as he arrives at the same conclusion as I do, concerning the absence of fibrils in the dentinal tubules, it will show that two quite independent observers, have by their researches, been landed into conclusions quite opposed to those of Mr. Tomes. Mr. Salter, unfortunately, has been as brief as possible in his description of this structure, and on account of being too concise, he has caused it to be exceedingly incomplete. Mr. Salter agrees with Professor Owen in the belief, that the dentinal tubules are filled with a fluid during life, and not by a fibril, and that the projections from the edges of a fractured tooth, mentioned by Mr. Tomes, are undoubtedly tubules, and not fibrils that have been drawn out of their tubes; the method by which these tubules are caused to stand out, is thus explained by him, "The animal basis of the dentinal tubules and that of the intertubular tissue are different; the former is considerably denser, and, after decalcification, strong hydrochloric acid will remove the intertubular substance, or render it absolutety transparent—thus the tubes can be isolated, and their minute diameter, corresponding with the dark dentinal tube, as seen in the profile view of hard sections, is at once recognized." Mr. Salter also agrees with Professor

Owen that the plasma may be stained yellow during jaundice, or be turned red or purple by the colouring matter of the blood; this, he considers, enters into the dentinal tubule, by a process of endosmosis through the cell-wall of a cell attached to the pulp extremity of that tubule, this cell, he calls a "persistent developmental cell," because it remains attached to the tube throughout the period of the life of the tooth, and assists in the growth of that tube. "The dentinal tubules have extremely thin walls, which can scarcely be said to be visible in the hard tissue when seen in profile, but which, in transverse section, as viewed by high powers of the microscope, display a broad brilliant ring of considerable thickness around each. This appearance is an optical illusion. * * * Whether the broad ring is the result of the curious phenomenon, irradiation, or the diffraction of light by the thin cut edge of the tube, I am not prepared to say." He gives an exceedingly rough diagram in order to show this supposed illusion, I shall refer to it afterwards. The dentinal tubules "occasionally exhibit dilatations somewhat like bone lacunæ." Mr. Salter further considers that the presence of 'contour lines' in teeth is a sign of "imperfect calcification of dentine," and he treats of them in the chapter on the "Congenital defects of structure and form." As his ideas on this point are given with some degree of detail, and differ from those of Professor Owen, and apparently also from those of Mr. Tomes, I shall hold myself excusable for giving his remarks somewhat 'in extenso.' "When a very small and thin layer of dentine is formed upon the upper outer surface of a tooth * * * its calcification rapidly follows. * * * The calcification consists not in an even, slow impregnation of the whole tissue with earthy matter, nor in an interstitial deposit of earthy particles in a wall of animal matter, nor a change having relation to the course of the tissues affected: it is an independent element of nutrition, affecting isolated points of the animal basis—points which become completely calcified, while the intermediate tissue remains unchanged." These points become spheres, and the spheres enlarge and merge into each other; when these spheres are completely joined together we have perfect dentine. "If, however, from a deficient nutrition, from an imperfect supply of calcareous matter, the animal basis of the dentine becomes only partially calcified, then the calcifi-

cation globules remain distinct, or are unevenly fused, the intermediate cartilage being soft and unaltered." The growth of the dentine still proceeds, and this imperfect layer becomes separated; but "when once this separation has occurred, no change appears to take place subsequently. * * * It must be remembered that during life, though there is this great difference in density between the calcified globules and the interglobular cartilage, there is no interruption in structural elements; *the interglobular space is completely filled with uncalcified cartilage, and the dentinal tubes pass indifferently through the hard and the soft structures.* When, however, such teeth are extracted and allowed to get dry, *the tenuous animal substance shrinks and dries up to a mere film,** while the calcified globules remain hard, sharp, and firm." The spaces left by the shrunken tissue, Mr. Salter states, become filled with air, and they present an opaque black appearance by transmitted light, and dead-white by reflected light. "If a section of imperfectly calcified dentine be examined dry, or mounted in Canada balsam so rapidly as to prevent the fluid resin from running into and filling up the interspaces, the dentine globules are seen in various spherical and convex forms bounded by black, opaque interspaces. The dentine in the globules themselves is perfectly formed, and the tubes may be traced across the globules, *and skipping the interspaces* across succeeding globules as though in a continuous line. * * * If a specimen of globular dentition be mounted slowly, so that the Canada balsam can run in and fill the interspaces, the structure loses all its black opacity and becomes very transparent."

I have now given in great detail the statements of three leading English odontologists concerning this structure, extracting more especially their points of difference, which, it will be observed, are very numerous. I have confined myself to these authors because they summarise all that has been discovered by other comparative anatomists, whether, English or Foreign, who coincide with their own conclusions; also because their works are the most accessible to English students and are therefore used as text-books. It will be my duty to place before the readers of the *Review* the results of my researches into dentine, in

* The italics are my own.

order to aid in the settlement of these antagonistic statements, and I will do so under nine heads—

I. Does a dentinal tubule contain a fibril or fluid during life?

II. Concerning the microscopical appearances of the tubules.

III. How do the lateral branches terminate?

IV. In what manner do the terminal branches end?

V. What are "contour lines"?

VI. What is globular dentine?

VII. What is Owen's "dentinal cell"?

VIII. Is there a "persistent developmental cell"?

IX. Are there lacunæ-like dilatations of the tubules?

By dividing the subject in this manner we shall arrive more easily at satisfactory conclusions, because when one's attention is directed solely to a single branch of a subject, one is more likely to arrive at a true conclusion than when wandering from one point to another; besides, each of these divisions naturally leads to its successor.

ON THE

MICROSCOPICAL STRUCTURE OF FOSSIL TEETH

FROM THE NORTHUMBERLAND TRUE COAL MEASURES.

By W. J. BARKAS, M.R.C.S.E., L.R.C.P. London.

CHAPTER XIII.

[*Continued from p.* 256.]

GENUS. PYGOPTERUS AGASSIZ.

This genus has been known to palæontologists for some time, but our knowledge of it is still somewhat meagre, if we may judge from what has been published concerning it. It was first described by Agassiz, in his celebrated work on Fossil Teeth, and he also gave therein drawings of the specimens he had had the opportunity of examining. The specimens, however, that he had under his notice were very few in number, and extremely fragmentary and damaged, but there can be no doubt that the genus he founded upon these injured specimens was a true one. Other authors have given short descriptions of this fish since Agassiz's work appeared, but they are very brief and

mperfect. The fishes of this genus belong both to the Carboniferous and Permian eras, but they were most plentiful during the latter. The majority of the species are found in both formations, the minority pertain to one or the other of them. There are nine that I have seen recorded; five being found principally in the Coal Measures, three in the Permian, and one is doubtful.

Although there are more species found in the Coal Shales than in the Permian formations, the individual fishes are much rarer. Pygopterus being a comparatively common fish in the Marl Slate (Permian) of Durham and Northumberland, while it is exceedingly rare in the Coal Measures of those counties, though it is not unfrequently found in the Coal Measures of other districts,—the Coal fields of South Staffordshire for example. Besides being rare in the Carboniferous period they are almost always obtained in a very fragmentary state, while in the Marl Slate the fishes are generally procured entire or almost so. Mr. T. Atthey, of Gofhort, near Newcastle, possesses, perhaps, one of the best collections of Marl Slate fishes of this genus, many of them being entire. Mr. Dinning, of Newcastle, has also a number of very good specimens in his cabinet. The Coal Measure specimens of this genus are very rare in this district; scales and jaws, however, have been obtained by Mr. T. P. Barkas, F.G.S., and by one or two other local collectors, which can be very easily recognised by their peculiar markings,—the jaws are even more uncommon than the scales, and are always much broken or distorted, but the fragments generally retain their teeth. Teeth are frequently found detached from the jaw, which are presumably teeth of Pygopterus, but they may belong to Palæoniscus or Gyrolepis. The jaws in the perfect fishes obtained from the Marl Slate are very rarely found intact, they are generally broken, crushed, or covered by displaced head bones. I have examined upwards of two dozen of these fishes and have only seen one complete mandible. I have never seen a perfect maxilla, nor any trace of a pre-maxilla, although Agassiz states that there is one. Such being the case I have not thought it worth while to give illustrations of fragments of jaws, but with regard to the mandible I may state that it agrees in shape, and to a great extent in size, with the mandible of Acrolepis, and as I intend in my next paper to figure such a

mandible, the readers of this *Review* will be enabled to recognise a jaw of Pygopterus, the only difference between the two jaws being in the characters of the markings on the external surface; concerning these markings I shall speak presently. Before entering upon the description of the jaws and teeth I will give a brief *resumé* of the general characters possessed by this genus:—The fishes are much larger than those of the genus Palæoniscus, their size varying from ten inches to two feet in length, according to the species; the body is elongate; fins large; paired fins nonlobate with fulcral scales along their anterior borders; dorsal fin opposed to the space between the ventral and anal fins; the ventral and pectoral fins less developed than the dorsal and anal; scales rhomboidal with light groovings in the direction of the long axis, each scale being articulated to its neighbour; tail heterocercal; upper jaw protrudes a little beyond the lower and consists of a superior maxilla and a premaxilla, according to Professor Agassiz, but no other palœontologist that I am acquainted with has ever seen a premaxilla; the teeth on both the upper and lower jaws are arranged in two rows and are of two sizes; branchiostegal rays many and enamelled; endoskeleton bony. From the above description it will be observed that Pygopterus differs little from Palæoniscus, except in size, and that it possesses most of the characters given by Professor Huxley to his family Lepidosteidæ, but whether it pertains to the sub-family Lepidosteini or to Lepidostini, I cannot say with certainty, but it possesses more of the characters of the latter than of the former.

The maxilla I have never seen perfect, but according to the late Professor Agassiz it is straighter than the mandible and articulates anteriorly with the premaxilla by an oblique line, while posteriorly and near the cranial articulation of that extremity it bends downwards and assumes a spatuliform shape. Whether this description is correct I am not in a position to assert, because, as I have already said, I have never seen a perfect maxilla, but the fragments that I have examined all tend to corroborate Professor Agassiz. Mr. Atthey, however, asserts that the maxilla presents the same form as the maxilla of Palæoniscus, only on a much larger scale, and as he possesses exceedingly perfect specimens, his statement is of great value, especially when we

remember that the jaws from which Professor Agassiz drew his conclusions were detached from the head, and the superior maxilla is evidently damaged along its superior border. The premaxilla I have never seen, nor has any other palæontologist, except Agassiz, come across it to my knowledge; it is probable that a premaxilla is present in the head of Pygopterus, but I certainly do not agree with Agassiz that what he calls the premaxilla in the illustration given in Tome II., Table 52, is really that bone, to my eyes it appears like a portion of the anterior extremity of the maxilla broken or displaced. The mandible is a long narrow bone, broader at the posterior extremity than at the anterior; the posterior extremity is slightly curved upwards and is hollowed out into a socket, this is also the thickest and strongest part of the jaw; the superior border is straight and the inferior slightly curved; the anterior extremity presents a surface for articulation with the mandible of the opposite side. The external surfaces of the maxilla and mandible are covered by numerous ridges and corresponding depressions, these markings are generally very fine and are always arranged in an oblique direction, passing from the superior border with a gentle slant towards the inferior, these ridges are not continuous from one border to the other but are broken every here and there in a very irregular manner, so that these elevated lines vary very much in their length; these surfaces are enamelled, and when placed in the light they reflect it, more especially from the summit of the ridges, but the enamel does not extend quite to the bottom of the depressions. The teeth are arranged along the alveolar borders of these jaws in two rows: an internal row of large teeth and an external one of minute teeth. The large or laniary teeth are conical, acutely pointed and curved near their apices, the curve being towards the interior of the mouth; they measure from one-eighth of an inch to one-fifth in length, in the Coal Measure specimens that I have examined, but in the same jaw they all maintain a similar height. The minute teeth are also conical, sharply pointed and curved, but they are subequal in height in the same row, varying in that respect from one-fifteenth to one-tenth of an inch. Although these laniary and minute teeth differ thus greatly in their height, they agree completely in their minute structure, which structure also

resembles that of Palæoniscus. The description I gave in my last paper of the structure of the teeth of Palæoniscus will therefore answer, almost perfectly, for that of the teeth of Pygopterus, the only differences being that the calcigerous tubules ramifying in the dentine and enamel of the latter, measure from one-fifteen thousandth to one-twenty thousandth of an inch in diameter at their origin, while those permeating the similar tissues of the teeth of Palæoniscus I stated to be between one-twenty thousandth and one-thirty thousandth of an inch; also, that the teeth attached to the jaws of Pygopterus are often found with a thin coat of enamel over the body of the crown. It will be observed that in respect to the size of the laniary teeth and the diameters of the calcigerous tubules and in the possession of a layer of enamel, that the teeth of this genus more nearly correspond to the supposed new genus, Ganacrodus of Professor Owen, than do the teeth of Palæoniscus. Detached teeth presenting all the characters, both external and internal, of the teeth present in the jaw of Pygopterus are frequently found in the Coal shales of Cramlington pit, where the tooth of Ganacrodus was discovered. It is, therefore, probable that Professor Owen's new genus is really Pygopterus, it might be Gyrolepis, the teeth of which are exactly similar to those of Pygopterus, but I do not think it probable for the reason that the detatched teeth are comparatively numerous, while I am not aware that a single scale or fragment of jaw of that genus has ever been obtained there. Scales and fragments of jaws of Pygopterus, however, are obtained. Mr. Atthey, as I mentioned last month, inclines to the opinion that Ganacrodus is merely a tooth of Palæoniscus, but then he founds his belief on the supposition that these detached teeth are teeth of that genus and not of Pygopterus, in fact he denies altogether the presence of the last named fish in our local Coal Measures. But really there is very little to differ about because if the teeth of Palæoniscus and Pygopterus were detached from their jaws, mixed together and then made into sections, it would be impossible to distinguish one section from the other by the size of their tubules, for this difference arises, I expect, from the size of the tooth. If one tooth attached to an undoubted jaw of Palæoniscus measured one-eighth of an inch I do not doubt but that

the calcigerous tubules of that tooth would be larger than the measurement I gave of the tnbules from teeth one-fifteenth of an inch in length, in the same way as the tubules of the minute teeth of Pygopterus measure somewhat less in diameter than those from the laniary teeth. If a minute tooth of Pygopterus were detached from the jaw it could not be diagnosed from a large tooth of Palæoniscus, unless it possessed a coat of enamel. However, Mr. Atthey and I agree so far that Professor Owen's new genus, Ganacrodus, is not a new genus at all, but belongs to one or other of the genera I have mentioned as possessing tipped teeth. With regard to Mr. Atthey's statement, that he has found teeth of Palæoniscus with a coat of enamel, I can only say that I do not deny the fact at all, I only assert that out of fifty-five teeth that I have examined I have never been able to find it once, and beside, Mr. Atthey does not say, in his paper in the third volume of the "Transactions of the Northumberland and Durham Natural History Society," whether the enamelled tooth of Palæoniscus was attached to an undoubted jaw or not. If a tooth of Palæoniscus is really enamelled sometimes, and occasionally attains to the height of one-eighth of an inch, then the difference between it and a tooth of Pygopterus will be nil. The tissue of the jaws of which I have made sections, is not so distinctly osseous in structure as the tissue of the jaw of Palæoniscus, it presents the appearance of homogeneous tissue permeated freely by large, irregular, freely branching canals, the branches being nearly as large as the main vessels, and they sometimes inosculate with the neighbouring canals. The pulp cavities of the teeth are continuous with the vascular canals. In the tissue intervening between the vascular canals and its branches there are occasionally, but not often, lacunæ with canaliculi ramifying from them; these lacunæ are much longer and narrower in proportion to their size than those in Palæoniscus but they are considerably less than the lacunæ in the latter genus. In my sections the lacunæ are not filled with dark carbonaceous matter, and are therefore very difficult to observe with distinctness from their similarity of colour to the surrounding tissue. Into the homogeneous tissue there appears to be, every here and there, numerous tubules running, which tubules arise distinctly from the canals; this tubular tissue is always found close to the alveolar

border, it may therefore, be merely the dentinal tissue of the teeth penetrating into the jaw substance, the tubules however are larger than those in the tooth proper. That the dentinal tissue does penetrate into the jaw is evident because it is by this means that the teeth are fastened, the further these teeth penetrate the more they lose their distinctive character and assimilate to the character of the substance of the jaw.

I have not given any engravings to illustrate this paper for the reason that my next paper on Acrolepis will furnish figures that cannot be distinguished from similar portions of Pygopterus.

MANIPULATION OF THE GODIVA COMPOUND.

By WARWICK HELE, L.D.S. Carlisle.

At a recent meeting of the Odontological Society, a member (Mr. Harding) observed, "That if the Godiva compound be used as carefully as plaster is, kept in as long, and allowed to set as hard, it is a much more pleasant thing to use; it does not give the same trouble to the dental surgeon or the patient, and you may get the same satisfactory results."—See Trans. Odont. Soc. December last, p. 36.

With this expression of opinion I entirely agree, but as the use of this preparation is attended with some practical drawbacks, for which I have seen no published remedy, I am not astonished at the apathy shown by some operators in adopting a material which, "all round," is the most perfect for dental modelling purposes.

The difficulty of successful manipulation places the Godiva Compound midway between plaster of Paris and wax; but by adopting some simple expedients, it will be used as readily as wax, and produce a model equal to, and in many instances superior to plaster of Paris.

I propose to consider the difficulty and remedy.

Practically, the Godiva Compound, as ordinarily used, is open to these objections:—

1st. In inexperienced hands it shows some tendency to crawl or shrink out of shape, after withdrawal from the mouth.

2nd. That after the plaster is poured, in separating the

model from the Godiva compound, there is a tendency to carrying along with it a quantity of the edge fragments of plaster, and as the compound pulls off in a ropy condition, it quickly gets such plaster fragments incorporated with itself, to the detriment of the preparation and the considerable loss of time in cleansing and re-preparing it for future use.

3rd. That the Godiva compound adheres with great tenacity to the model trays, and so much so that they are frequently injured in removing it; the temperature required for that purpose being sufficiently raised as to endanger melting pewter trays.

The first objection disappears, in fact, has no existence, if the Godiva be first properly softened, and then allowed to set in the mouth before it is withdrawn.

The compound is no doubt best softened by dry heat, but as that is regulated with some difficulty, I prefer using absolutely boiling water. If small thin cakes be placed in absolutely boiling water, and left therein undisturbed for two minutes, the Godiva is softened evenly throughout, and should at once be placed in the model tray, from which any superfluous portions are *then* most easily removed by the means of scissors. The modelling is now performed by adjusting the compound evenly and firmly over the parts to be modelled until home, then held so, without the least displacement, for the space of two minutes before withdrawing.

It is convenient to have a sand-glass constructed to run two minutes, turned for guaranteeing this time of setting.

By following this plan I have acquired models of difficult cases more perfectly and easily than by any other, or by the use of any other material, not excepting plaster of Paris.

As to the second objection, it is easily overcome. Before pouring the plaster into the Godiva mould, the outside surfaces of the compound, its inside edges and the palate should be lightly anointed with oil thickened by having had some wax melted therein (wax, ʒss, oil ʒj, is a good form), and those portions of the model tray exposed to the contamination of plaster should be treated in like manner. When the plaster is poured and set sufficiently hard—from five to eight minutes—to be freely handled, the superfluous portions must be cut away, right up to the round lip edge

of the Godiva, in fact, to as nearly as possible that contour line, which is usually followed in trimming the model *after* the compound is removed. Before placing the model in hot water, for separating the compound from it, both the Godiva and model tray should be briskly cleansed of plaster fragments, and the wax ointment by means of a brush and soap and water.

The water used for separating should not be at boiling point, but only of such a temperature as the hand can bear. The model and compound must remain in this temperature for two minutes, quite undisturbed, when by drawing up the edges of the compound all round off the model, and allowing air and water to be sucked in by gently rocking the tray, with, if necessary, the replacement of the model and compound in the hot water for a few seconds, the whole compound will be found to come away at once in the model tray, clean, and in one piece.

Now this naturally brings us to the third objection, the difficulty of separating the compound from the model tray; for this, as far as I am aware, there has been no published remedy.

The shabby, battered condition of model trays, with edges broken, or run into lumps, returned from the work-room, after only once or twice being used, is trying to witness, much more submit to, as the regular result of the use of the Godiva compound. Nevertheless, it is a difficulty most easily overcome, for if before placing the softened Godiva in the model tray, the inside of the tray and outside edges be smeared over with wax, melted by the flame of a spirit-lamp, the tray being held the while in the flame, the compound will adhere strongly and evenly enough for modelling purposes, but after casting will come away in one piece from the tray, leaving it quite clean, if exposed to a temperature high enough to melt the contained wax.

It may be objected that all this requires an amount of time not commensurate with advantages gained. In reply, it is easier to perform a process quickly than to describe it in a short space so as to be intelligible. As a matter of fact, in practice, one half-hour has sufficed an operator when following these methods, to soften the Godiva, prepare the tray, model the mouth, allowing two minutes for the setting, to anoint with the oil and wax, mix and pour the plaster of Paris, allowing five to eight minutes for the setting,

to trim the edges, then cleanse with the brush and water, re-soften and separate the compound. Within the same half-hour the model tray and Godiva have been parted, and the compound, being quite clean and free of plaster fragments, has been pressed into a small thin cake ready for future use; the model tray being heated, to melt the contained wax, has been wiped free thereof, and at once polished ready for the next operation.

In practice it is well to keep a stock of the extra soft compound, and occasionally add it in the proportion of one-third to two-thirds of that previously used, the latter otherwise becomes hard and brittle after repeated use, although the admixture of the small quantity of wax used in preparing the tray tends to preserve the properties of the compound for a longer period.

The small portions of the compound which becoming attached to the sides of the bason, during the softening, quickly form centres for the accumulation of other foreign matter, are with some difficulty removed, the application, however, of spirits of turpentine by means of a rough flannel, quickly overcomes this "malaise."

CASES OF CHRONIC MERCURIAL POISONING FROM THE USE OF PINK AND RED VULCANITE IN ARTIFICIAL GUMS, WITH REMARKS AND EXPERIMENTS.

By W. Bathurst Woodman, M.D.,

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(MEDICAL PRESS AND CIRCULAR, DECEMBER 9TH, 1874.)

As the red sulphide of mercury is one of the oldest preparations of that metal, as it is extensively used in the arts, and has been employed in medicine from a very remote antiquity, it is not surprising that its poisonous properties have long been familiar to medical men. My own attention was drawn to the subject by the actual occurrence of cases in patients coming under my care some ten or twelve years ago. I could find no other explanation of their symptoms, except that they were wearing artificial gums, or artificial palates covered with vermillion. I had never then heard that the same facts have been noticed by others, and the experiments then undertaken, and since repeated, were made in complete ignorance of the labours of others on the same subject. In the last edition of Dr. Taylor's great work on "Medical Jurisprudence," vol. i., p. 290, he states, under the heading of "Cinnabar Vermilion—Persulphide of Mercury," that Dr. Sutro published a case in the *Medical Times*, September 27, 1845, p. 17, of poisoning by the *vapour of vermilion* applied externally.

"A woman, by the advice of a quack, applied the vapour to a cancerous breast. She employed three drachms of vermilion, and covered herself with a sheet, so that the vapour should only reach the body externally. After three fumigations she suffered from severe salivation, and violent fever, which continued for four weeks. The right arm became œdematous." A few lines above, he says: "It (cinnabar) is also improperly applied by some dentists as a colouring matter to vulcanised rubber for mounting artificial teeth. Although this insoluble compound of mercury caanot be regarded as an active irritant poison in the stomach, the placing of it in such a situation that it should always be in contact with the mucous fluids of the mouth is liable to lead to the usual consequences of chronic poisoning by mercury.

In May, 1864, a medical man consulted me under the following circumstances: Upon the recommendation of a dentist, he had worn this red composition as a frame for false teeth in place of gold. After some time he perceived a metallic taste in his mouth, the gums became inflamed and ulcerated, there was great weakness and want of nervous power, with pains in the loins, and an eruption on the legs. *When the composition was removed, these symptoms abated.* [The italics are mine.—W. B. W.] I examined the substance, and found in it a great quantity of vermilion; it had been mixed with the sulphur and rubber to give the appearance of the red colour of the gums.

Dr. Wells, of Reading, has directed the attention of professional men to accidents of this nature. A patient of his who had been provided with a frame of this description for the upper and lower jaws, perceived, soon after wearing it, a metallic taste in his mouth; his health failed, he lost his appetite, and became emaciated; he suffered from flatulency, fœtid breath, and looseness of the bowels; his pulse was 100, and weak, and his tongue coated with a white film. This gentleman was peculiarly sensitive to the action of mercury. He left off wearing the teeth, and became gradually better and stronger." *(British Medical Journal*, September 5th, 1863, p. 366.)

Dr. Taylor goes on to state that vermilion, or the organic compounds containing it, may be entirely decomposed by nitro-hydrochloric acid. The residue, avaporated to dryness, contains corrosive sublimate. This may be treated with water, ether, &c., and the usual tests applied.

It might almost be inferred from Dr. Taylor's statements that only dentists of an inferior class use or recommend these natural-tinted rubbers, or vulcanite, and that the basis, thus tinted, was always the same. I found, however, on inquiring carefully, that very large quantities of this material were manufactured, and that in past years at least, dentists of the highest respectability, and in various parts of this kingdom, as well as on the Continent, had supplied their patients with this *matériel vraiesemblant.* It is not always vulcanite. I had specimens of various depths of tint, from varying proportions of vermilion; and of varying hardness, some of the cheaper kinds being simply blanched gutta-percha incorporated with cinnabar. I have to thank Dr. Martin G. Payne, F.C.S., for several specimens obtained by him for me, others were given me by friends, and some I bought. The result of my examination and experiments is as follows:—

1st. All the pink and red artificial gums, palates, and materials for the same which have been examined by me contained vermilion. It is well to state this, as several dentists have questioned the fact, and others seemed surprised. Some of my medical and chemical friends have suggested that preparations of lead, chromium, and other pigments would probably be found in some. I can only say no such specimens have yet reached me.

2nd. The quantity of vermilion present was not always proportionate to the depth of tint. Some of the most beautiful and natural specimens contained the pigment rather in a state of very fine division than in any great quantity.

3rd. Does the warmth of the mouth, and the action of the saliva, or of articles of food, actually produce volatilisation or solution of the pigment? As the temperature of the mouth seldom exceeds 37° or 38° centigrade, and saliva is a very dilute solution of the saline substances it contains, the possibility of both these methods of possible injury has been questioned. I believe, however, that poisoning occurs in both ways, and possibly by a third method—viz., by conveyance to the stomach, along with the food ingested, of minute particles worn off in the process of mastication. As regards the first method, or volatilisation, I have satisfied myself by delicate methods of analysis that nearly all the mercurial compounds are somewhat volatile at lower temperatures than 98° or 100° Fahr.

It may be remarked parenthetically that lead, arsenic, and numerous other bodies, in forms not usually deemed volatile, are so in a slight degree, as proved by continuous observation at ordinary temperatures, a fact well-known to chemists. But the prepared rubber or tinted vulcanite, *slowly gives up its mercury* (which is only mechanically mixed with it), both to saliva and to an artificial solution made to imitate it with common salt, sulpho-cyanide of potassium, &c., at 60° Fahr., and more quickly if the solution be kept at 100° Fahr., and the metal can be easily detected by electrolysis, as well as by other tests. This solution may be hastened by agitation. Solutions of several of the haloid salts have similar solvent properties. If any one repeats my experiments, he must be content to keep the saliva or other fluid in contact with the rubber for several days. To test for the cinnabar, if our object be to rapidly prove the presence of the metallic pigment, the rubber or vulcanite should be finely sliced, put into nitro-muric acid with a little distilled water and exposed to the heat of a sand or water bath.

4th. It will probably be objected, that although this solution goes on slowly, yet the constant washing of the artificial gum or palate would really prevent the occurrence of mischief in the human body. As this is simply a theoretical objection, it seems best answered by narrating three or four out of about a dozen cases observed by me from the year 1862 up to last year, 1873 As in the cases quoted by Dr. Taylor, it will be seen that, once rid of the corpus delicti, the red gum, not of Australia nor of the nursery, but of the dentists, the patients rapidly recovered. "*Tollitur effectus, sublatâ causâ.*"

5th. It is to be noted that the saliva and urine in some of these cases contained minute but unmistakeable traces of mercury, every possible precaution being taken to avoid known and probable sources of fallacy.

CASE I.—*Ptyalism, Rupoid Eruptions, Cancroid Sores of the Mouth, and Mercurial Erythism in a Patient of the Torbay Infirmary.*—In the year

1862, a poor woman, living in Torre, æt. 50, consulted me on the state of her mouth. She was profusely salivated; the few teeth she had left were all loosened; there were sores of a deep, ragged, and spongy character in the cheek and gums, like cancrum oris; her breath was extremely fœtid, and she had rupoid sores on the body, a general condition of fever, muscular weakness, and general irritability. There was also diarrhœa of a dysenteric kind. In her case there had been previous symptoms of constitutional syphilis, and as she had been under quasi-medical treatment, I suspected that she had been purposely salivated. Indeed, I did not know that she was then wearing a plate of red vulcanite, because she always took it out before coming to see me, and indeed, could not wear it when she first came. It was only when similar symptoms recurred some twice or so at intervals of six weeks or two months after recovery, that I began to suspect some chronic and perennial source of mercurial poisoning, and at last discovered the fact of her wearing a vulcanite gum, supporting seven or eight teeth, which had been given her by some charitable ladies, on account of her speech being so defective. This gum, when examined, proved to contain a very large admixture of red sulphide of mercury. This case had, however, almost escaped my memory when case No. 2 occurred.

Case II.—*Mercurial Eczema and Erythism in a previously healthy Woman.*—Mrs. F——came to the London Hospital in 1864, and was seen by me during the holiday of one of the assistant-physicians. Unfortunately, I have omitted in my notes to state whose case this really was. She presented a most typical, but pitiable picture, of almost general eczema, of the king generally known as rubrum. Where there was as yet no discharge, there was intense redness of the skin, and minute papules. Her age was about 40; the catamenia regular. Her general health had been good, in fact, till about three months before, she "had never known a day's illness." Now her condition was sad in the extreme; there was muscular tremors, swollen and ulcerated gums, the breath extremely fœtid, and profuse salivation. She was feverish, excitable, and owing to want of sleep, the irritation of the skin, and perhaps some special toxic effect, her mental condition closely bordered on insanity. Those who have watched cases of poisoning by the methyl compounds of mercury will know why I make this special reservation as to peculiar toxic effects upon the cerebrum. She was wearing a plate of red gum with some five or six teeth in the front of the mouth, to replace the incisors, &c., of the upper set, which she had lost from accident many years before. Asked how long it was since she had been quite well, she replied, "Not since I had my new teeth." This was simply a chronological method, as she had not the least idea of the "plate" being the cause of her symptoms. This "gum" was longer than usual, in fact, it fitted nearly the whole of the roof of the mouth, presenting some four or five square inches of surface at the least. This time, however, it attracted no suspicion. Its use was left off for a time, simply because the mouth was so bad. Admitted to the hospital, she soon got well, with baths, gargles, chlorate of potash, and soothing local treatment. About six weeks after she relapsed into a condition nearly as bad as her former one. This time the resemblance of her symptoms to mercurial poisoning attracted more attention, as the most careful inquir yfailed

to show any other possible source of poisoning than the "teeth-plate" in question. She had taken no medicine—used no doubtful cosmetics—been exposed to no danger from any manufacture. In short, no reasonable doubt could be entertained as to the cause being some mercurial, for mercury was detected in her saliva, and also in the urine passed by her. The plate was then examined, and found to contain vermilion in large quantity.

It may appear strange that after these two cases, both of which were cured, I believe permanently, by leaving off the use of their new teeth, my attention should not have been more directed to this source of danger. The explanation is simple. Hundreds of people were wearing these plates, and the peculiar symptoms were noted only in one or two. Mercury enters so largely also into popular pharmacy that one often suspected "*vegetable*" or "antibilious" pills, rather than a cause much nearer home. In the year 1867, two or three similar cases came under my notice in Hampshire, and I could not fail to be struck with the fact that all were wearing these red or pink gums, and that in all the cases there was a sort of chronological sequence between the acquisition of the new teeth and the occurrence of the symptoms. In 1868 and 1869, one or two other cases occurred, but I cannot say that any one of them, taken singly, would have carried conviction to my mind. I know of no special character of "mercurial" fœtor, and eminent surgeons whom I have consulted agree with me, that except from other symptoms, from the history of the case, or from discovering mercury in the saliva, urine, or other secretions, there is no pathognomonic character in either mercurial salivation or its fœtor. Yet my attention was now aroused. I began to collect "red gum material," to make experiments, and to look out for cases. It was not long before one occurred amongst my own acquaintance.

Case III.—*Salivation, Diarrhœa, &c., in an Aged Lady.*—I was consulted for some apparently anomalous symptoms occurring in an old lady, previously of wonderful health and vigour, although closely approaching her 80th year. The house in which she lived was well-built, on high ground, in a healthy situation, and careful inquiry failed to discover anything in her mode of life, or her surroundings, or her past history, to throw light upon her symptoms. She had become irritable, feverish, wakeful at night, tremulous, weak, and utterly prostrate, without any obvious cause. Yet her intellectual faculties were clear enough. There was no kidney disease—no evidencies of arterial lesion—no known cause for the mental perturbation or bodily malaise. At the same time, she began to be salivated, to have a coppery taste in the mouth, her palate and gums got sore, there was troublesome diarrhœa, and other unpleasant symptoms. On examination I found she was wearing a large plate of pink vulcanite with teeth imbedded in it, these teeth being of a very good artificial compound, chiefly consisting of silica. The symptoms were at once relieved, and lastly cured, by leaving off this plate and getting a gold one instead. She now enjoys excellent health, considering the advanced age she has reached.

Some still more striking cases presented themselves in the years 1870-1-2, two of which, at the risk of being thought tedious, I will relate.

Case IV.—*Hydrargyrism in a Young and previously Healthy Woman.*—M. P——, æt. 18, was brought to me suffering from ulcerated mouth, sail-

vation, tremor of the limbs, hysterical symptoms, and a sort of lichen-eczema, not so unlike grocers' itch, except for its brighter colour and more intense character. She had been a fine healthy girl, quite regular, quite free from nervousness or hysteria, and came of a healthy stock. When quite a child, a drunken man had knocked out some of her front teeth, and for this she had lately been persuaded to wear some artificial ones in a frame of red vulcanite. I examined her mouth, got her to save a considerable quantity of saliva (some three to four pints nearly were rapidly and easily collected), and I tested this and her urine, and in both found sufficient mercury to "silver" a sovereign. She was ordered to *leave off the plate*, to keep the mouth clean with a weak solution of Condy s fluid; a little zinc ointment was used for the eruption, and no medicine given. She also rapidly got well.

The next case was in a man of about 36, and is, if anything, still more convincing.

CASE V.—*Symptoms of Poisoning by Mercury cured more than once by leaving off the Vulcanite Gum, and recurring again when the Teeth were resumed.*—A literary man was brought to me by one of my medical friends who had heard me speak of the use of these plates. The patient had some years before suffered from symptoms of syphilis, and my friend thought it possible that our patient had been quacking himself. The symptoms were chiefly confined to the mouth, except the nervous phenomena, which closely approached those of hysteria. He was married, and we could not discover any sexual or alcoholic excesses. His mental labour was not excessive, and he had a private income, which kept him from any special anxiety as to money matters. He had been wearing a red vulcanite plate in the lower jaw for about seven months. The symptoms commenced about five or six weeks after this had been fitted. He admitted that he often slept with the plate in his mouth. We agreed not to tell him our suspicions, but to treat the local symptoms, advising him not to wear the teeth till the mouth grew harder—indeed, at this time he could not bear it in the mouth. *Mercury was found in the urine.* We did not examine his saliva at the time for obvious reasons. He soon got well, was allowed to resume his teeth, and in six weeks was again ill in the same way, though not so badly. Treated as before. On once more resuming the plate (six months after first attack), he was again salivated, had ulcers in the mouth, &c. This time the saliva was found to contain mercury, when a sufficient quantity had been collected. Once more the red gum was left off, and once more he got well. The nature of the case was then explained to him; but he was so incredulous as to our statement, and so full of confidence in his dentist, who was a personal friend of his, that he began again to wear the plate. Three weeks after he told me triumphantly that he was all right; but ere another three weeks slight symptoms had set in, which became more severe; he was attacked with a species of writer's cramp in the right hand, and then he was persuaded to finally abandon the treacherous teeth—or rather their setting. He has had a gilt metal frame, and has ever since been perfectly well.

Résumé.—I think few candid persons will doubt that in some cases, perhaps more numerous than we now think, severe effects follow the continued use of artificial gums, palates, and teeth-plates coloured with mercurial pigment.

The amalgams used by some dentists may produce similar symptoms. The question is one which I think well deserves the attention of scientific dentists and chemists. I write on it as a practical physician; and as my cases extend over nearly twelve years, I do not think I have displayed undue haste in doing so. There is some danger now of arsenical, lead, and chromium pigments being substituted, and toxic symptoms, due to these metals rather than to mercury, may possibly have been noticed in some cases. A dental student told me that herpes labialis is unusually common in those who wear false teeth; but this may possibly be due to mechanical irritation only. Well-fitting teeth are otherwise so desirable, that it would be well to devise and employ some pigment of a natural colour which should be free from the objections attaching to all the metals I have named.

CRITICAL ABSTRACTS FROM "LE PROGRES MÉDICALE."

CONTRIBUTION TO THE STUDY OF NECROSIS FROM PHOSPHORUS.

By Dr. Jagu.

THE recognition of necrosis occasioned by phosphorus, may be traced back a score of years. Laringer, of Vienna,* was the first to discover this disease, which, since that time, has been studied by a number of surgeons. The seat of election of this evil is in the maxillary bones, but it may extend as far as the bones of the face and cranium.

It is this complication, and the indications which result from it, the treatment of which Dr. Jagu has studied in his work. The extension of this disease is occasioned, says the author, by the stagnation of pus, (which should be contended with by derivatives and counter-openings), and by the expectant treatment which has been of late years too generally adopted.

Passing from this, the author passes in review the opinions of different authors, and of the most remarkable surgeons, which are divided into two camps, the one, like Loringer Trélat,† Hervieux,‡ Nélaton, would trust to nature alone the work of sequestration, the other, amongst whom we may cite Langenbeck, Billroth, Jobert (de Lamballe), Verneuil,§ Guérin, advise intervention when

* Loringer's *Nécrose des os Maxillaires consécutive à l'action des vapeurs Phosphorées*, Vienne, 1845.

† Trélat. Thesè d lágrégation, 1850.

‡ *Union Médicale*, 1848.

§ *Bulletin de la Société de chir.*, féories, 1870.

the necrosis threatens to invade all the bones, and to make a resection of the mortified parts before their mobilisation.

In support of this second opinion, M. Jagu shows that osteitis often continues its invading march, even after the mobilisation of the sequestered part. Besides, suppuration which accompanies the disease, is a cause of exhaustion. Finally, when the pus has not an easy and free egress, it may separate the periosteum, and favour the progress of osteitis.

Nevertheless, as the author remarks, this theory has nothing exclusive in it. Every case, as M. Magitot says,‖ offers peculiar conditions and different indications. This subject is worthy of the consideration of those practitioners who find themselves between two modes of treatment quite opposite. It appears to us, they should decide on their treatment according to the special conditions, and local and general state of the patient.

De Bouteillier.

"LE PSORIARIS BUCCAL, BY DR. M. DEBOVE."

The *Progrès Médical* has already published (1873) some remarks of Dr. Debove upon the singular affection of the buccal mucous membrane, which the author has made the subject of his inaugural address. In this account may be found related all that concerns the symptoms, the progress, and the termination of the disease; we wish to-day to give a very succinct analysis of those pages which relate to pathological anatomy, etiology, and treatment.

Unfortunately, as M. Debove remarks, it is not easy to write a complete chapter on pathological anatomy, and that is because buccal psoriaris, no more than cutaneous psoriaris, does not necessitate the death of the patient, and consequently does not allow a necroscopic examination of their organs. However, if the psoriaris is not mortal of itself, it can, by a frequent complication (cancer) lead to grave results, which necessitate the removal of the diseased part. It is in this way that M. Debove has been able to examine anatomically two cases of which one, was taken

‖ *Union Médicale*, 1873.

from a man who had succumbed to cancer of the tongue, engrafted on a lingual psoriasis, and the other from a patient operated on by M. Verneuil, for cancer of the cheek with psoriasis of the same region. Already Hulke (*Medical Times*, 1861) examined with the microscope a piece of lingual psoriaris growing, and found there colossal papillæ, similar to those on the tongue of the cat. In the specimens examined by M. Debove, the lesions appeared to be much deeper, and to be principally seated in the mucous chorion, so that really the epethelial layer is simply a little thick, the chorion hard, grating under the scalpel, and with a thickness four to five times greater than in the normal state; these modifications are due to a conjunctive hyperplasia, very dense, which penetrates as far as the muscular layer of the tongue, which it comprehends, atrophying the most superficial fibres; there is true sclerosis of the lingual mucous membrane, and it is there M. Debove sees a profound anatomical difference between cutaneous psoriasis, and buccal psoriasis; in the latter, nevertheless, the thickness of the epithelium is a fact beyond doubt.

Referring to its etiology, the author remarks that buccal psoriasis is seen little, except in adults and old men, and it is very rare among women, doubtless because the habit of smoking is not wide-spread among them. Tobacco, in fact, constitutes the most evident occasional cause of this affection which, when it occurs upon the lips and commissure, is known under the name of smoker's plague, nevertheless this cause does not appear to be indispensable. Syphilis, often falsely accused to the great detriment of the patient, does not appear to act, except in awakening, sometimes upon the organs it has touched, a scurfy or arthritic predisposition. We must, however, always admit the necessity of this predisposition, as among the number of smokers how very few are attacked by buccal psoriasis; it is, according to M. Bazin, arthritis that is most frequently responsible.

Treatment, moreover, justifies this last opinion; alkaline medicines above all, give the best results. M. Debove greatly praises the effects obtained by the local pulverisation of the water of Saint Christian. It is needless to add that the use of tobacco must be absolutely forbidden.

It may be seen from the above, and from the remarks previously inserted in the *Progrès*, that the work of M.

Debove is quite an original study, which could only be made complete by the combined application of the skill of an anatomist, and the sagacity of a clinic.

ODONTOMES.

(Traité des Tumeurs. Par Paul Broca).

(*Continued from page* 313.)

All the bulbous odontoplastic odontomes that I have been able to study during or after dentification, shew an irregular, unequal, nippled, mulberry form, or even vegetative surface. It is allowable to infer that the tumour, before dentification, presented the same irregular form. This was clearly shewn upon an odontome in the course of dentification that I had occasion to study (Fig. 14). The hypertrophy of the pulp, effected in an unequal manner, gives rise to the projections, elevations, and vegetations, which, separated by deep furrows, may become the seat of secondary growths, which present an appearance more or less analogous to that of the cauliflower. This complicated disposition is produced more easily in proportion as the tissue of the tumour is soft and vascular. Upon the specimen to which I have just referred, the narrow cylindro-conical, numerous, pressed together growths, resemble very much the villosties of a papillary tumour, and may be found in the whole substance of the tumour. This kind of papillæ, free for the greater part of its surface, which was regular and smooth, and fixed at the base, which was the largest part, upon a common mass whose ramifications spread throughout the whole tumour.* Each papilla shewed all the elements of a small normal bulb; a cortical layer formed of an exterior layer of amorphous matter, and of a row of dentinal cells, surrounded by a little central mass, vascular and fibroplastic, whose tissue was exactly like that of the pulp during the odontoplastic period, and where may even be found a number of dentinal grains. Finally, many of these papillæ are clothed with a thin layer of gelatinous substance, which, examined by the microscope, shews a row of enamel cells. It may therefore be said, that

* This disposition of the papillæ, not very apparent at the time the specimen was drawn, is not seen distinctly upon the engraving. It was shewn plainly by a practical dissection by aid of a needle.

bulbous hypertrophy produces decomposition of the primitive bulb, shewn by a very great number of *secondary* bulbs, which present all the conditions requisite for dentification.

The tumour, after having been removed by resection, underwent a vertical and longitudinal cut, which commenced upon the lower edge of the maxillary A, B, and extended from below upwards, to the neighbourhood of the upper edge CC. Thus divided in two halves, almost entirely separated CC, A, B, it was shewn; these two halves



FIG. 14.

Fig. 14. Odontoplastic odontome in the course of dentification, occupying the half of the right lower jaw in a little girl, aged two years and nine months.

are not symmetrical, because part of the tumour was enucleated at the moment the section was made, so that the mass C, B, remained undivided, following the external segment, leaving here upon the other segment, the wall of the osseous cyst; D, cavity of the small compensating molar; EE, section of the body of the jaw in front of the odontome; C, first temporary molar having achieved its eruption. All the other molars are englobulated in the

tumour, and have no fangs. *a*, Second temporary small molar; *b*, second large molar; *d*, third large molar turned round. The first donble molar not to be found; it was at the expense of its bulb that the odontome was developed. The numerous elevations which are perceived upon the section of the tumour, are secondary bulbs. Many of them, e, f, g, h, i, j, k, l, are already surmounted by the large dentine caps, which are invested with the form of dentine crowns. Besides, in *hh*, for example, the secondary bulbs, much smaller, very numerous, and very near together, are surrounded by little cases of dentine, which the section shews to have a madrepore-like aspect. The tumour is soft, the remainder of its extent.

The remarkable phenomena, *the multiplication of bulbs*, explains all the details of dentification, which is begun at a great many points, either upon the superficial secondary bulbs, or upon the deep bulbs of the tumour. There, where it has made its début, are seen little conical cases of dentine, constituting the true dentine caps which, first appearing on the summit of each bulb, extend gradually to its base. Where it is most advanced, the thickest cases, with a narrow central cavity, become fused at their bases, besides being united on the surface, and constitute, by their reunion, a tolerably hard mass, which the section shews to have a madrepore-like aspect. Besides, finally, and this alone would be sufficient to shew the reality of the multiplication of bulbs, the most voluminous bulbous elevations, have given rise to masses of dentine, shewn in the form of teeth. It might even be asked if these are not true teeth, disturbed in their development, and deformed, but proceeding from normal bulbs englobulated in the mass of odontome (see Fig. 14). In shewing this specimen to the Surgical Society, I was able to shew eight of these teeth, seen upon the section of the tumour; and as the disease occupied a region which could only have seven dental bulbs, that is to say, two for the single temporary molars, and five for the definitive molars, double or single, one of the single permanent molars having been erupted regularly, and independantly of the tumour, it is clear that at least two supplementary teeth were enclosed. Afterwards, preparing the specimen for the artist, it was necessary to excise some fragments of pulp, to shew on the surface of the section two other unicuspid dental

crowns, without counting two small isolated cusps, which were on the point of becoming covered in the same manner as those referred to above. It is consequently plain that the hypertrophied pulp had in this case given rise, not only to a number of small bulbs, their structure being shewn microscopically, and by the little dentine cases which embrace them, but to a certain number of bulbs, sufficiently voluminous to engender true dental crowns.

What would have happened if the tumour had not been removed? It cannot be doubted that dentification, already commenced at numerous points, would be extended throughout the whole mass, that all the bulbs would be surrounded with cases of dentine, which would afterwards be joined to their neighbours, and that the odontome would be complete, by being transformed into a tumour, principally composed of dentine. Besides which may be found throughout, both on the surface of the tumour, and in the deep furrows which penetrate between the bulbs, a gelatinous layer, characterized by the presence of enamel cells, all which allows belief that a dentified odontome should enclose a certain quantity of enamel, disposed irregularly on its surface.

Besides, all these peculiarities which the study of this odontome in the course of dentification allows to be seen, are found on the dentified odontoplastic odontome which M. Forget has placed in the Dupuytren Museum, No. 384 c, and of which he allowed me to see the microscopic sections. The tumour entirely dentified, offers a nippled, mulberry-like form, covered with small rounded vegetations, between which exist deeper or shallower depressions. Upon the section may be seen with the eye, two very distinct substances, the one extremely hard, of shining white, forming an irregular layer on the surface of the tumour, and constituting besides, linear trains which are uniform with the depressions on the surface; this substance, seen under the microscope, shews the structure to be enamel. The other substance, much more abundant, is of a much duller white, or even slightly yellow; its consistence, although very hard, is much less so than that of enamel; the section shews a large number of small rounded spots, which give it a granulous appearance; seen with the microscope, it is almost entirely composed of dentine; but a large number of small rings, either round or oval, re-

sulting from a transverse or oblique section of the small, almost cylindrical, canals, and filled with dentinal grains, or amorphous calcareous deposits, represent the obliterated cavities of the old dentine cases, developed upon the secondary bulbs of the hypertrophied pulp. The comparative study of this specimen with the preceding one, will leave no doubt as to the origin and the work of dentification in bulbous odontomes.* This work, considered in its essence, does not differ from that of normal dentification, but we have just seen that the conditions present whilst it is effected are quite special, and the dental tissues which result from it, shew an isolated disposition. These conditions do not allow the odontome to be invested with the form of a dental crown, and are generally opposed to the formation of fangs. In fact, these latter can only be developed when the dentine shell which surrounds the bulb extends *regularly* and *circularly* as far as the base of the pulp; if the dentification gains one side of this base before the shell is upon the other points, or if it is produced at the same time, upon the surface and in the centre of the tumour, as was the case upon the specimen I have described, or if in fact, any other disturbance should hinder or accelerate that which should be the gradual formation of dentine, the formation of fangs becomes impossible. But when the hypertrophy of the pulp is not very considerable, when the odontome is not voluminous, when all the secondary bulbs are superficial, all commence dentification simultaneously, it may exceptionally happen that, notwithstanding the serious disturbance which the evolution of the bulb has undergone, the dentine envelope descends pretty regularly upon the base of the pulp, to realize the conditions analogous to those which, upon normal crowns, lead to the formation of a dental neck, and afterwards of fangs. This has probably taken place, in a very remarkable and perhaps unique case, observed in 1809 at the Hôtel Dieu, by M. Oudet, in the service of Pelletan. This specimen was claimed by Pelletan, who later gave it to Miel the dentist. I am not

* I regret to have omitted in the description of these two specimens, a great number of curious details, which are too long to detail here, and which I have given in my work upon odontomes. M. Forget's specimen is very well shewn upon Plate I. of his work already mentioned, "Sur les Anomalies Dentaires."

aware what has become of it, but before relinquishing it, M. Oudet took a model in lead, which he still possesses, and which he was willing to lend me; he likewise sent me an excellent original drawing by Miel himself, a drawing that Et. Geoffrey Saint Hillaire has reproduced in his work already quoted (*i*), that I, in my turn, reproduce in Fig. 15. The examination of this drawing proves that it was an odontoplastic odontome; this was fully confirmed by the examination of the cast, for in studying all its surfaces, there cannot be found the least appearance of portion of crown regularly formed. All the dentine elevations surmount it, are informal, and evidently developed upon the secondary bulbs. Besides, this odontoplastic odontome is



FIG. 15.

continuous at its base with a conical mass, which immediately gives the idea of a fang, but of a quite abnormal, enormous, irregular fang, upon which I have counted a dozen longitudinous furrows, more or less complete. In this case, the formation of a radicular prolongation realized the conditions which lead to the eruption of the teeth. The odontome was then able to penetrate the gum, and take rank in the dental arch, in the place of the two single molars. The development of this irregular fang had doubtless been favoured by the smallness of the odontome, and it is probable that in proportion as it was formed, a thin layer of cementum was deposited on its surface. However, it appears certain to me that the cementum did not participate at all in the constitution of the odontome, properly speaking. Whichever way it was, this fact has been unique up to the present time. In a general way, it may be said that bulbous odontomes have no fangs. It must not be forgotten that in animals who have no cementum organ, the cementum is only produced upon the pulp.

Consequently in man, dentified bulbous odontomes do not contain cementum.*

When dentification is achieved, the tumour generally provokes around it a sort of inflammatory reaction, followed by suppuration, and if the osseous cyst be then opened, the dental mass will be found entirely free. It may be asked, whether this isolation, which easily allows extraction, is the cause or effect of the suppurative inflammation. It is plain that it might be the effect, and that the suppuration which is produced in the interior of the osseous cyst, is of a nature to lead to the destruction of the fibrous or vascular adherences, which might still exist between the walls of the cavity and the base of the tumour; it is thus, that all inflammation occurring at the bottom of the alveoli, may cause the fall of the teeth, that is to say, the destruction of their vascular and nervous pedicle. It is probable, nevertheless, that in many cases the isolation of the tumour precedes and produces inflammation. There may then occur a phenomenon, similar to which sometimes happens in old people, the spontaneous dropping out of teeth. Dentification which in the most healthy teeth continues to take place in the interior of the cavity during life, and which consequently augments the thickness of the dentine walls at the expense of the pulp volume, often finishes at an advanced age by filling the whole dental cavity, and causing the entire disappearance of the pulp. The tooth then becomes a foreign body and is gradually expelled by the retreat of the alveolus. Dentification of bulbous odontomes leads to a disposition similor to this. In examining the base of these tumours, after their expulsion or extraction, no vascular opening is to be seen, nor any orifice that could give a passage to the finest pulp fillament; this is, then, completely dentified like the teeth of old people, and it may be well imagined that this circumstance, being of a nature to transform the tumour into a true foreign body, and which, deprived of all its connexions, and becoming free in the cavity of the cyst, has every chance of provoking around it the accidents of inflammation and suppuration.

* This proposition would appear to be invalidated, by the description M. Forget has given of his dentified bulbous odontome. But I have studied the specimen with the greatest care, and I am convinced it contains no cementum. I have more amply discussed this fact in my work on odontomes.

In the preceeding exposition I have supposed the bulbous odontome to be dentified in a single mass. This is the most ordinary and the most simple case. The continuity of the dentified mass, indicates, that the odontome before dentification is clothed over its entire surface with a layer of dentinal cells, so that if this layer might be wanting in some parts more compressed than others, it would at least be everywhere continuous with itself. But this continuity of the cortical layer may easily be at fault. In the irregular and unequal development of the hypertrophied bulb, the cortical layer more or less compressed, can only offer unequal resistance upon the various points of its extent. For example, the folds corresponding to the depressions which separate the secondary bulbs, may undergo from the adjacent bulbs such pressure, as to cause atrophy of the dentinal cells, and thence it may happen that the secondary bulbs after their dentification may not become fused with one another. It is thus, I think, may be explained, the formation of osseous cysts of the jaws, on which may be found several, or even a great number of hard masses, more or less round, irregular, and unequal in volume. I have not had an opportunity of observing them, but there are remarks by Dupuytren, which it is impossible to interpret otherwise. This surgeon removed from an enormous osseous cyst of the upper jaw, "an astonishing quantity of unequal, irregular bodies, very hard, formed of osseous matter, and it is impossible to give a better idea of them than to compare them to the voluminous masses of iron dross which are found on the roads."* This comparison of the osteoides in question with pieces of dross, that is to say, with the iron scoræ of the forge, is very significant, for it is perfectly applicable to several specimens of dentified odontomes that I have had in my hands. Dupuytren did not analyse these osteoides; he did not examine them with the microscope. I have not, then, the right to affirm that these were heaps of dentine; but their position, their number, their complete isolation, the youth of the patient, all depose in favour of this interpretation.

Duval published in 1811, in the *Bulletins de la Faculté de médicine* (No. 8, p. 168), a very abridged note upon a fact which has some analogy with the preceding one. This fact

* Dupuytren, *Leçons orales, publiées by Brierre de Boismont et Marx.* 2nd édit 1839. f. II. p. 135. Observ III., du chap. des Kystes osseux.

was communicated by Girard, Professor in Alfort. There was found in the "sinus maxillaire" of a horse, a molar tooth which "had undergone such irregular development, that it was with difficulty that a tooth was recognized in the rounded informal mass that appeared." This tooth, adds the author, "was situated, *as well as several others*, in the maxillary sinus." In the human subject, dentinal cysts have often been taken for cysts of the maxillary sinus; it is not, then, astonishing that the same error should have been committed by Girard. The description of the principal dental mass accords so well with that of odontomes, that the diagnosis cannot be doubtful for us. Besides, at the side of this dental mass, and in the same cavity, there were *several others;* this appears to indicate that it was an odontome dentified in several distinct masses.

ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

ANNUAL MEETING, JANUARY 11TH, 1875.

The President, EDWIN SERCOMBE, ESQ., in the Chair.

After the minutes had been read and confirmed, the ballot box was opened to receive the voting papers for the election of the President and Officers of the Society for the ensuing year.

The following Members, recommended by the late Council, as Officers and Councillors for the year 1875, were duly elected—

PRESIDENT.—*John Tomes, Esq., F.R.S.* VICE-PRESIDENTS.—(Resident).—Alfred Coleman, Esq., *Samuel Cartwright, Esq., John W. Elliott, Esq.* (Non-Resident)—S. Clifford Gibbons, Esq. (*Brighton*), T. R. M. English, Esq. (*Birmingham*), *G. W. Buchanan, Esq., (Glasgow).* TREASURER.—James Parkinson, Esq. LIBRARIAN.—Thomas A. Rogers, Esq. CURATOR.—C. S. Tomes, Esq. HONORARY SECRETARIES.—*Henry C. Sewill, Esq., (Council), J. Smith Turner, Esq., (Society), Oakley Coles, Esq.* (For Foreign Correspondence). COUNCILLORS.—(Resident)—Aaron G. Medwin, Esq., T. C. White, Esq., C. J. Fox, Esq.. Edwin Saunders, Esq., *Charles Vasey, Esq., G. A. Ibbettson, Esq., Henry Moon, Esq., W. G. Ranger, Esq., Thomas Edgelow, Esq.* (Non-Resident.)—F. J. Clouston

Scott, Esq., (Swansea), George Henry, Esq., (Hastings), G. W. Smith, Esq., (Manchester), E. P. Bromley, Esq., (Southampton), *Frank Petty, Esq., (Reading), J. E. Rose, Esq., (Liverpool).*

NOTE.—The names in the preceding list printed in Italics are those of the *new* Officers and Councillors recommended for election.

The President having invited casual communications,

Mr. C. J. FOX mentioned a new rubber valve, specimens of which he had obtained from the Dental Manufacturing Company, for retaining artificial palates *in situ.* It had been his intention, he stated, to have brought it forward at the last meeting, at which Mr. Hall, the original inventor in America, and Mr. Rutterford, who first introduced it to this country, were present. Having tried the valve in three instances, he found that it was most favourably reported upon by his patients, one of whom was present and could be seen. The valve might not be necessary in all cases, but it would be found very useful in cases where patients showed no ability to acquire the habit of suction, and also where patients with very flat palates refused to have the roots of teeth extracted. He saw no traces of any drawing of the mouth, which he had heard mentioned, in either of the cases that had come under his notice.

Mr. OAKLEY COLES having tried this application in five cases, found it successful in three, where there was a well defined alveolar arch and a flat palate. Where the sides of the palate were at an angle to each other it failed. As a member of the profession he wished to protest somewhat against the Dental Manufacturing Company bringing out these contrivances almost immediately the American inventors introduced them into this country. They ought to have some consideration for those people who invented things and take the trouble to bring them out for the benefit of the profession; some support and preference was due to them rather than to a company which took an idea and reproduced it without any respect to the real moral right the inventor had in the matter.

The PRESIDENT was sorry to be obliged to take exception to that remark, because it was directly in opposition to the laws of their Society, which would admit of no patent or right in anything brought out. Taking out a patent, or

having an interest in one was sufficient to dismember a member of the Society.

Mr. OAKLEY COLES said he was not speaking in reference to members of the Society. He simply referred to two people who brought out an invention that was certainly valuable in a number of cases. Directly that was introduced into this country it was imitated and brought out by somebody else. If they were to stimulate original inventions they ought to support those people who brought them out in the first instance.

Mr. HARDING said he had used these india-rubber discs in four cases, and the best proof of their success was the fact that he had heard no more of his patients.

In answer to Mr. West, Mr. OAKLEY COLES said he should not use these valves for a lower case. If he found a lower case likely to be moved about he should adopt a suggestion made by Mr. Turner, and load it with lead or some heavy material.

Mr. MUMMERY then read a paper by Mr. Hele, of Carlisle on a case of dilaceration of an upper permanent incisor, due to improper lancing.

Dr. LESLIE, from the United States, brought before the Society a specimen of crystallized gold, which he said he had prepared for Professor Tyndall, who had never seen this metal crystallized. He (Dr. Leslie) had devoted many years to the preparation of gold for dental purposes, and claimed to have been the introducer of cohesive foil to the dentists of the States in 1839. After three years continuous experiments he had succeeded in producing this crystallized gold, which would be found to possess certain advantages for dental purposes over foils, though it would not supersede them entirely.

Mr. HUTCHINSON mentioned a case of separation of the central incisors in an elderly lady, in which great pain was caused by the pressure of the central on the lateral. Relief was eventually gained by placing an india-rubber pad between those teeth.

Mr. OAKLEY COLES described a new gas reflector introduced by Mr. Stewart, F.R.C.S., a specimen of which had been fitted up in the hospital.

Visitors were then directed to withdraw whilst two alterations in bye laws, 70 and 21, were discussed. The

alteration in bye law 70 was in order to allow a meeting of the Society, when the first Monday in the month happened to be a Bank Holiday, to be postponed till the following Monday. This was agreed to *nem. con.*

The alteration in bye law 21 was an important one. The bye law was, "The President and two senior Vice-Presidents, one resident and one non-resident shall go out of office annually, and shall not be eligible for re-election to the same office for the ensuing year." The proposal was to omit the words "President and," the effect of the omission being to admit of the re-election of a President for a second consecutive year of office. This gave rise to some discussion, it being the opinion of some members that the Vice-Presidents should have been included in the change, and also that the custom of electing the President from the Vice-Presidents of the previous year should have been adhered to. After full and satisfactory explanation had been given, the bye law was amended as proposed.

The Treasurer's Report showed an income of £442, and an expenditure of £466, the excess of expenditure over income being due to the expense of removal from Soho to Leicester Square.

The retiring President then delivered an address, of which the following is an abridged report:—

Gentlemen,—To-day our Society completes another year of its existence, and its closing hour will not be inappropriately spent if it is devoted to an examination of its work during that period. You will all remember with what hope it opened, we were on the eve of migrating with the Dental Hospital, from the house which had been our home for many years, to these more extensive premises. Opinions varied as to the advisability of the move, and, whenever was any important step taken, in which more than one individual had a voice, that there was not difference of opinion? So far, however, from such differences being undesirable, I regard them as signs of a healthy vitality, nothing is so much to be dreaded as a dead uniformity of opinion. A free and unrestricted expression of opinion was given on both sides, but there was no partizanship, and the minority yielded most loyally to the clearly expressed opinion of the majority.

"Then none were for a party,
Then all were for the state."

I think on the whole, the Society might be said to have advantaged the more, we have a more commodious meeting room, although we must all admit it lacks the elegance of our late one; our Museum accommodation is infinitely superior, so that I think the balance will be freely accorded in favour of our present quarters, but I will not give further expression to my individual opinion on this point, as my object is only to advert to the loyal support both the Hospital and this Society have received during the year, even from those who were opposed to the change, and that, as a consequence, the Society is to-night in a prosperous and healthy condition. It is my happiness, on retiring from this chair, to know that the Society is, both financially and numerically, in a better position than it has ever been before. It has been my great misfortune to be prevented by indisposition, for a period of two months, from taking any active part in the work of the Society, but I have had the great satisfaction of knowing that the interests of the Society have been so ably and diligently sustained by my friend Mr. Vasey, to whom I desire thus publicly to offer my warmest thanks that it has suffered no loss by my absence. And gentlemen, whilst his name is before us, I must be allowed to allude to his disinterested conduct in retiring into the body of the Council, in order that the Society may have the enormous advantage of being presided over by Mr. Tomes during the coming year. Mr. Vasey's natural modesty of character has induced him to take a step which his fitness to preside over this Society, as shewn during the two months he has so kindly discharged my duties, rendered altogether unnecessary, but I trust he will be willing, at a future day, to occupy a post he is so well fitted to fill, with credit to himself, and advantage to the Society.

I feel bound to say that I have received the most cordial and hearty support from the Council generally, to all of whom together I beg to offer my warmest thanks.

Without attempting to analyze the various papers which have been read during the year, I may say they have, for the most part, taken a wider range than hitherto, and as the education of dentists is becoming broader, we must look for this change in the character of our papers; the two first read this year were on important points connected with mechanical dentistry, the next was a short but

valuable communication from Professor Rolleston, on an ancient British skull, which he was kind enough to present to our Museum, the next was on Epitheleoma of the tongue; the importance of the dentist being acquainted with other diseases than those immediately connected with the teeth, was pointed out by surgeons who took part in the discussion on this paper. Early treatment of this disease is of vital importance; long before its presence would be suspected by the unfortunate victim, it might be discovered by the dentist, who could advise aid to be sought while it would be of any avail. "Transplantation of Teeth;" an able paper on "Dentigerous Cysts," by Mr. Thomas Bryant, of Guy's Hospital; "On the condition of the Mouth and Teeth during Pregnancy;" and "Studies on the attachment of the Teeth," have successively engaged our attention, and without in any sense being chargeable with using a stereotyped expression, I may say they have each reflected credit on the writers, and have been a valuable addition to our literature.

To the writers of various papers, as well as to those who have furnished the casual communications and taken part in our discussions, our best thanks are due.

At the beginning of these remarks I said that the Society was numerically, as well as financially, prosperous. Twenty-five new members have been elected during the year, the largest number, I believe, for many years; our losses, however, have been large, nine have resigned from various causes, three of this number having retired from practice, and thus no longer eligible to be members of the Society; in addition to these, five have been removed by death—Dr. Hitchcock, of Boston, U.S., Messrs. Little, of Bristol, Parsons, of Bristol, Perkins, of London, and Yeo, of Malta.

Dr. Hitchcock had been only recently elected a member of our Society, but he had been long and favourably known in this country as a highly accomplished and cultured gentleman, his early death has inflicted a heavy loss on the profession.

The highly complimentary notices which appeared in the Malta papers concerning our late *confrerè*, Mr. Yeo, show how distinguished a position he held among his fellow countrymen in that island. He was well known to, and much esteemed by many members of this Society as a

highly creditable practitioner of our art. With the other members of our Society, whose deaths we deplore, I was personally unacquainted. I trust it will be long before we have again to place so many *immortelles.*

In conclusion, permit me to glance for one moment beyond the limits of our Society to the profession which this Society has done so much to elevate. Foremost among the events of the past year must be placed the removal of the Dental Hospital and School to the house in which we are now assembled. The results of this change are already beginning to be felt. Hitherto, our work has been done in so unobtrusive a manner that the general public were under the impression that Dental Surgery was not taught systematically in this country, it was desirable, therefore, in justice to ourselves that our light should no longer be kept under a bushel, but set on a hill; the public are taking a deep interest in our work, and a very general feeling of satisfaction exists that students can acquire in this country a thorough knowledge of the art they are to practise.

In connection with this subject I may notice that the first dental scholarships founded in this or, I believe, any other country have been founded this year, one by that gentleman to whom we already owe so much, Mr. Edwin Saunders, the other by Mr. Agnew and Mr. Fletcher, of Warrington.

Beyond our own transactions I know of only one work of importance published this year, viz., that of Mr. James Salter. Very important discussions have been carried on in the various journals on the all-important subject of materials for stopping teeth and the best modes of manipulating them.

Although no great revolution either in theory or practise can be recorded, the year may nevertheless be regarded as one of steady and satisfactory progress.

And now, gentlemen, it only remains for me to restore to your hands the important office you did me the high honour to entrust to my care last year. I have striven to do my duty, but no one can feel as deeply as I do myself how it has been accomplished, for although I have much cause for congratulation, as I have endeavoured in these few remarks to show, I am painfully sensible that I might have accomplished much more than I have done.

Let my last word be one of hope, that the coming year

may be characterised by even greater prosperity to the Society than the past, and of congratulation that it is to be presided over by one who has done already so much to ennoble the profession we all love so well.

In proposing a vote of thanks to the retiring President, Mr. Mummery said it was a piece of singular good fortune that the transfer of the Society from its old to its new quarters should have happened during his reign, for to his noble efforts, and indomitable determination to carry out the undertaking, they were very largely indebted for the great success which had attended the original proposal. They felt deeply grieved that there should have been any interruption to his health during his term of office, and heartily rejoiced to see him on that occasion able so effectually to occupy the presidential chair.

The thanks of the Society were also accorded to the Treasurer, Secretaries, and Curator for their services. The Society then adjourned.

NOTES OF CASES OF FRACTURE OF THE INFERIOR MAXILLARY BONE.

By Richard Barnett, M.D., M.R.C.S.E., etc.

(Read before the Ulster Medical Society—February, 1874.

In 1836, a man named Macdonald, a coachman in the service of a gentleman residing a few miles from Belfast, returning one evening to his master, was waylaid and knocked down; when on the earth his assailant gave him a kick with a heavy shoe, which fractured the lower maxillary bone at the symphysis. The man was admitted into hospital, but at the end of three months' treatment, union of the fractured surfaces had not taken place, and he was discharged. He was now placed under my father's care. There was a space of half an inch between the extremities of the fractured bone, one extremity being drawn in towards the base of the tongue. The four incisor teeth and alveoli containing them having exfoliated, the most anterior teeth that presented themselves were the right and left canine teeth.

A ligature of silk was tied firmly around the canine tooth of that portion of the bone which was drawn inwards toward the base of the tongue by the action of its attached muscles. One assistant had charge of this—another, by means of a small instrument, like a fork, fitted to the neck of the other canine tooth, pressed that portion of the bone backwards, and so reduced the fracture as to leave the mouth free from anything that would interfere with the subsequent steps of the operation.

Bees' wax was softened and placed in a frame suited for taking impressions from the lower maxilla. This was carefully introduced into the mouth, and an impression taken of the space in the front where the incisor teeth *had been*, and of all the remaining teeth on both sides.

From the cast now taken a frame of silver was made, which fitted all the teeth of the lower maxilla, and dipping down from the apices of the canine teeth on each side to fit the space between these teeth. The silver capping-frame was now introduced into the mouth, and found to fit the crowns and exposed surfaces of all the teeth, and the space in front; but the man had no command over his jaws, and there was a strong involuntary lateral movement which was to be overcome, or the steps hitherto taken would have been useless. A strong silver bar was now soldered on the outside of the frame, and in a vertical position, so that when the mouth was closed, this bar passed between the buccal surface of the superior molar teeth and the cheek of that side of the frame to which it was soldered. This effectually prevented lateral movement in the opposite direction, which may be readily understood. A second bar was now attached to the opposite side of the frame, having the same relation to the superior molar teeth on that side. There could now be no lateral movement to either right or left side.

It now remained to make arrangements for feeding him, and that was managed in the following way. A silver bar was soldered to that part of the frame which covered the apices of the canine teeth, thus leaving a considerable space from the inferior margin of that bar to the frame covering the surface of the gum, and through this space he was fed. This bar also strengthened the frame, which at this part most required it, as it was more liable to injury at the central part.

This apparatus—consisting now of a frame, fitting all the lower teeth and gums, having two side bars in a vertical position, and one bar in the centre, passing from the apex of one canine tooth to the other, the space for feeding the patient being underneath this bar—was placed *in situ*, and the bandages passed round the vortex of the cranium in the usual manner. The patient, being directed not to interfere with the mechanism or disturb the bandages, went to the country.

At the expiration of six weeks he returned, and the bandages being removed and the instrument taken out of his mouth, it was found that he could open and shut his mouth at pleasure, the teeth on the right side and left being on the proper level. However, as yet the union was principally cartilaginous, and would yield in a short time if left without support. The bones at seat of fracture were now rubbed, the one against the other, to cause irritation and excite more rapid ossification; and the frame being thoroughly cleansed—an operation it required very much—was replaced in the mouth, and the bandages applied as before. He returned in three weeks, and it was found that he had the perfect use of the lower maxilla. He was recommended to keep the frame in his mouth for another fortnight, and then to return it; and as he was going to seek a new service in a distant locality, he was requested to call on a medical gentleman who resided in that neighbourhood, and who was much interested in his case, but he neither returned the frame nor revisited any of those gentlemen who had exhibited so much interest in his case.

OLBIQUE FRACTURE OF LOWER MAXILLARY BONE.

On December 24, 1872, I was asked by Dr. James Moore to see a boy, Christopher White, aged fourteen, then in the General Hospital.

A fortnight before, the lad had fallen out of one of the port-holes of the "Gibraltar" training-ship, a depth of 17 feet, into a boat alongside, and

Dr. Moore being on board the ship at the time, had him removed same day to hospital.

The lower maxillary was fractured obliquely, internally from a point beneath the right lateral incisor, running outwards toward the left canine tooth, the left central and lateral incisor teeth and their alveoli being also carried away at the time of the injury, leaving an ugly fissure.

An external wound under the symphysis, communicating with the cavity of the mouth, was almost healed when I saw him. The smaller portion of the bone was drawn in and downwards by the depressor muscles of that side, and there was a considerable amount of motion between the affected parts.

In order to restrain the voluntary and involuntary motion of the parts, and at the same time, give room for the introduction of food, I made a vulcanite splint. I passed a waxed silk ligature between the bicuspid teeth on the left side; and while an assistant, by means of this ligature, reduced the fracture, and, at the same time, retained the base of the bone in position, I introduced a metal tray of suitable size, filled with soft wax, into the mouth, and thus obtained an accurate impression of all the teeth and contiguous gums, including the seat of fissure, having also taken an impression in wax of the teeth of the superior maxilla. From these impressions, plaster of Paris models were made—those marked No. 1 now on the table.

A vulcanite splint was now made to fit accurately all the teeth of the lower maxillary—to cap them, and to descend over the gums and alveoli, both internally and externally. The superior surface of the splint was carved out, so as to fit the grinding surfaces of the *superior* molars when the jaws were closed. On the left side a block of vulcanite was carried in a vertical direction, so as to fit the outside of the left upper molars when the mouth was closed, the object of this being to prevent all lateral motion.

On the 27th December this apparatus was introduced into his mouth. A piece of gutta-percha, previously softened in warm water, so as to take the mould of the external soft parts, was placed outside, under the base of the bone. This was semi-lunar in shape, and gave great support, some cotton wool being placed between the skin and the surface of the gutta-percha. Bandages were carried over the crown of the head, and around the neck, so as to steady all.

The following day I filled the upper surface of the splint at one part, so as to let the incisor and canine teeth on the right side through its surface. This made it more comforfable. The patient fed himself on soups and other fluid food, through the hole that can be seen by examining the models on the table. This space corresponds with the loss of teeth at the time of injury.

Two or three times a week the splint was removed from his mouth, cleansed with a tooth-brush, water, and soap; and mouth-wash, containing tincture of myrrh, being used at the same time.

Feb. 12. 1873.—The lad returned to his ship, able to do without the splint, and to give a very good account of a beefsteak; and the parts remain in a satisfactory condition at present date, fourteen months after fracture.

DENTAL STUDENTS' SOCIETY, 40, LEICESTER SQUARE.

ORDINARY MEETING HELD MONDAY, DECEMBER 14TH, 1874.

DAVID HEPBURN, Esq., L.D.S., in the Chair.

THE minutes of the previous meeting were read and confirmed, and Messrs. Corani, Jewers, Gaddes, Stevens, Slate, and Phillips were duly elected members of the society.

Mr. ROBERTS brought forward a very excellent little instrument which served the purpose of napkin holder, tongue compressor, and reflector. This little contrivance having been tried many times at the Hospital and proved thoroughly successful, is now in the hands of Messrs. Ash & Sons, who will shortly bring it out.

Mr. WOODRUFF expressed his approval of it, and thought it invaluable as a napkin holder.

Mr. G. HAMMOND showed some specimens of Carbolised Adhesive Cork for capping exposed nerves, its adhesive property making it much more successful than any other preparation he had ever seen.

Mr. HARDING brought forward a bi-fanged upper molar (second) which had been extracted by him a few days previously.

Mr. D. HEPBURN thought the second upper molar was far more liable to be abnormal than the first, and it was not uncommon to meet with abnormal second molars.

Mr. F. J. BENNETT thought as the teeth went backwards so there was a greater tendency to abnormality, as for instance the wisdom teeth, which were the most abnormal of all. This was the exception however in the case of the first bicuspid.

Mr. BERT then introduced a very ingenious contrivance of his own—an automatic mallet—whereby the amount of pressure could be regulated at will. This little instrument, although truly a scientific one, is altogether free from complication and cannot easily get out of order.

Mr. D. HEPBURN thought it a very clever contrivance, likely to supercede all others.

Mr. DAVID HEPBURN contributed models of the jaws of a boy who bore about him many well-marked symptoms of hereditary specific disease. As shown by the models, the teeth were characteristically affected, especially the right central incisor of the upper jaw, which was short, peg-shaped and slightly notched. The specimen was accompanied by a short essay on the origin and characters of the so-called "Hutchinsonian teeth," in which Mr. Hepburn expressed the idea, that he thought it probable that the peculiar formation of these teeth was due to the effects of inflammatory action, commencing after birth, and not to causes acting directly upon them whilst "in utero." The essay was illustrated by drawings of authentic cases, copied from Mr. Hutchinson's plates.

Mr. WEISS wished to know if incisor teeth mentioned, were permanent or temporary ones.

Mr. HEPBURN thought they were temporary ones.

In answer to Mr. J. Bennett, Mr. Hepburn thought that one should only take the groove-marked teeth along with other symptoms, and not as conclusive in itself.

Mr. B. HAMMOND then read the following notes:—A boy, aged 14, came to me with face much swollen on right side, extending down to the glands of the neck. He complained of great soreness on opening the

mouth, and was evidently suffering a good deal of pain. On examination I found all the teeth perfectly sound, but a quantity of pus welling up from a large abscess situated posterior to the second molar, which tooth was quite loose, and almost hidden by the swelling. I probed the abcess, but could discover nothing to account for the irritation, and had the patient been older, I should certainly have suspected something wrong with the wisdom tooth. I then remembered a somewhat similar case which came before me some three or four years ago—that of a lady who had a very sore mouth caused by biting a fish-bone up between her teeth. However, this patient said he never eat fish. So I searched again with the probe, and at length felt distinctly something loose deeply imbedded and lying obliquely behind the second molar. I extracted this, and it turned out to be part of the rib of a rabbit about half-an-inch long, which he had eaten on the Sunday previously. I recommended warm water to be held in the mouth, and saw the patient next day. The swelling had somewhat subsided, but the tooth was still loose. I then painted the right side of the gum with—℞ tinct. Iodi, tinct. aconiti, ā ā—for three successive days, when the tooth became quite firm, and patient well. Thus saving a tooth which, in all probability, might have been extracted, patient having come to me for that purpose.

Mr. Weiss promised to bring forward some notes on a case in which rubber bands had slipped up the fang and caused great destruction to the tooth.

Discussion of Mr. Hammond's case.

Mr. David Hepburn said that with regard to the use of elastic bands, he never used them unless they were attached to plates, or the patient was under daily observation, as he had seen very disastrous results produced by them, and mentioned a case in which a lateral and central incisor had been lost by their employment and subsequent neglect.

A remarkable case, illustrative of the evil results which may be brought about by the presence in the mouth of foreign bodies had come under his notice. About a year ago a patient applied at the Middlesex Hospital, having a tumour of considerable dimensions in the right submaxillary region. From the patient's history, nothing could be gleaned as to its nature, it was, however, deemed expedient to remove it, and an operation was performed. Mr. Hulke, under whose care the patient was, made an incision about two inches and a half long in the region of the tumour, and after a lengthy and careful dissection, came down upon a hard body, which was at first mistaken for one of the cornua of the hyoid bone, it however, turned out to be a large calculus formed in the substance of the submaxillary gland, and was accordingly removed. Afterwards, when the calculus was divided in its centre, was found a small splinter of wood, which, by some means or other, had found its way into the gland, and had there formed the nucleus for the deposition of the calcarious salts.

Mr. Willis (hon. sec.) then addressed the meeting on behalf of the council with regard to some financial alterations which were proposed to be made at the next annual general meeting.

The meeting closed with a vote of thanks to Mr. Hepburn for his kindness in taking the chair.

The next being the annual general meeting, it will be held on January 18th, 1875.

DEATH FROM THE ADMINISTRATION OF BICHLORIDE OF METHYLENE.—Another of these unfortunate cases occurred a short time since at the Royal London Opthalmic Hospital, during the inhalation of methylene. The patient was suffering from caries of bone near the lacrymal sac. Operation was determined on, and Mr. Buller administered the anæsthetic, bichloride of methylene, by means of a perforated leather inhaler covered with flannel. Three drachms were inhaled, and in two minutes the breathing became stertorous. After the operation, the pulse at the wrist suddenly failed, and then the respiration ceased. All known means for restoring animation were employed, but without avail.—*British Medical Journal.*

LONDON DENTAL HOSPITAL.

CASES TREATED FROM DECEMBER 1ST TO DECEMBER 31ST, 1874.

Extractions. Children under 14	215
Adults	397
Under Nitrous Oxide	188
Gold Stoppings	67
White Foil ditto	66
Plastic ditto	95
Irregularities of the Teeth treated surgically and mechanically	59
Miscellaneous Cases	159
Advice Cases	43
Total	1289

DAVID HEPBURN, *House Surgeon.*

The following Publications have been Received:—

The Dental Register.
Johnston's Dental Miscellany.
Le Progrès Dentaire.
Le Progrès Médicale.
The Dental Cosmos.
The Pennsylvania Journal of Dental Science.
The Missouri Dental Journal.
Deutsche Vierteljahrsschrift.
Transactions of the Odontological Society.
Correspondenz Blatt.
Boston Journal of Chemistry.
The Dental Advertiser.
The London Medical Record.

TO CORRESPONDENTS.

ALL communications intended for the Editor should be addressed to the care of Messrs. SMITH, ELDER & CO., 15, Waterloo Place, Pall Mall.

All inquiries respecting Advertisements and Subscriptions should be sent to Mr. GEORGE BUTCHER, 4, Crane Court, Fleet Street, E.C.

THE MONTHLY REVIEW
OF
DENTAL SURGERY.

No. IX. FEBRUARY, 1875. Vol. III.

THE RELATIVE COST OF LONDON SOCIETIES.

The Balance Sheets of our Societies are not as a rule very interesting, and we believe very few of the Members of our various London Societies take the trouble to read them. When, however, the various items of which they consist are placed side by side in a tabulated form, they at once assume an importance, which in their isolated state they do not seem to possess.

On carefully examining the Balance Sheet and Annual Report of the Odontological Society of Great Britain, we were so much surprised at some of the items, that we thought it desirable to compare it with the Balance Sheets of five of the principal Medical Societies of London. The result of our comparison is given in an adjoining page of the *Review*, where it will be seen that, taking only such items as are least subject to mistaken interpretation,* the Odontological Society holds a position, that is by no means to be desired by its well-wishers.

In our examination we have in every respect shown all possible favour to the Odontological Society, so that it

* The relation between the cost of the illustrations and that of the letter press is of course subject to alteration, according as a larger or smaller number of copies are printed. The data given in the table must therefore be interpreted with this source of inaccuracy kept in view.

might appear to the greatest advantage, and yet even doing this, its position is not at all satisfactory.

A careful examination of the adjoining table will show that we have given—(1) the date when each Society was instituted, (2) the number of members, (3) the number of meetings in the Session of each Society, (4) the amount of entrance fee, (5) the annual subscription, (6) the rent which each Society pays, (7) the number of copies of Transactions printed by each Society, (8) the gross cost of those Transactions, (9) the cost per volume, (10) the average size of each volume, (11) the number of pages in each volume, (12) the number of plates, and (13) the number of woodcuts; whilst in a separate form we show the cost, to each member, of the privilege of attending each meeting of the Society to which he may belong, first deducting from the amount of the annual subscription the value of the volume of Transactions which he receives.

The conclusions that must be drawn from an examination of the table we have prepared, are, (1) that the cost of attending each meeting of the Odontological Society is greater than that of any other kindred society. (2) That its Entrance Fee and Annual Subscription is higher than that of any other society tabulated, excepting only the Royal Medical and Chirurgical Society. (3) That its Transactions cost more than any other Society mentioned in our table, and lastly (4) That with the exception of the Clinical Society, (established 11 years after the Odontological,) we possess the smallest number of members. It is needless to observe that facts and conclusions such as we have brought forward, can neither be ignored nor argued away, and it is because we desire that the Odontological Society should more fully receive the support of the entire body of the Dental Profession, that we bring the matter thus clearly—and we trust forcibly—before both the Members of the Society and the Dental practitioners of Great Britain, in order that such reforms may be instituted as shall place the Society on a footing more nearly equal with that of its kindred associations.

THE RELATIVE COST OF LONDON SOCIETIES.

Society.	When Instituted.	No. of Members.	No. of Meetings.	Entrance fee.	Annual Subscription	Rent.	Transactions. No. of Copies	Gross Cost.	Cost per Volume.	Average size of Volume.	No. of pages.	No. of plates.	No. of Woodcuts.
				£ s. d.	£ s. d.	£ s. d.		£ s. d.	s. d.				
Odontological	1856	291	8	3 3 0	2 2 0	50 0 0	400	204 16 6	10 3	demy 8vo	296	11	11
Medical-Chirurgical	1805	657	15	6 6 0	3 3 0	200 0 0	750	300 0 0	8 0	ditto	298	9	20
Clinical.....	1867	279	15	1 1 0	1 1 0	47 5 0	500	96 13 9	3 11	ditto	300	5	11
Pathological.....	1846	548	15	1 1 0	1 1 0	63 0 0	600	240 6 11	8 0	ditto	415	12	13
Medical.....	1773	300	22	1 1 0	1 1 0	70 0 0	400	90 0 0	4 6	ditto	196	0	0
Obstetrical	1858	700	10	none	1 1 0	162 0 0	800	270 0 0	6 9	ditto	309	3	15

Actual Cost for right of attendance at each Meeting of the above Societies, after deducting the value of the Transactions.

	s.	d.
1. Odontological Society	3	11
2. Medical-Chirurgical	3	8
3. Obstetrical	1	5
4. Clinical	1	1
5. Pathological	0	$10\frac{1}{2}$
6. Medical	0	9

THE MONTH.

Pepsine Paste and Lacto-phosphate of Lime.

We are glad to hear that, at the suggestion of the Dean, a series of experiments is to be made at the London Dental Hospital, with a view to testing the value of Pepsine Paste and Lacto-phosphate of Lime as therapeutic agents for the treatment of exposed dental pulps.

The Dean's Prize.

The profession are indebted to Mr. Thomas Rogers, for directing attention to the value of preserving the dental pulp, by offering a prize for the best recorded set of cases treated by any of the students of the London Dental Hospital. The first prize that has been awarded, has been gained by Mr. Whatford.

The Edwin Saunders' Scholarship.

Now that the testimonial to Mr. Edwin Saunders is to take the form of a scholarship, there seems no reason why the contributions to the fund should be limited to a guinea. We have always failed to see the value of such a restriction, and certainly in the present instance it is desirable above all things that a considerable amount should be raised. If those who are interested in the movement, are allowed to give according to their appreciation of Mr. Saunders' services in moving the Dental Hospital to Leicester Square, we may expect to hear soon that a very large sum has been collected.

Calendar of the London School of Dental Surgery.

We have received a copy of the first Calendar of the London Dental School and Hospital. The annual publication of such a work will be of great value to all those who, from any cause, take an interest in Dental education. It will, moreover, beyond this, be a great help to the student, in enabling him to make such arrangements with regard to Lectures, Hospital practice, &c., that he may waste as little time as possible, whilst going through his curriculum of study.

The President's Address.

The last Meeting of the Odontological Society was chiefly remarkable by the delivery of the President's address and the presence of a larger number of members than usual. Mr. Tomes chose for the subject of his

Inaugural speech, a subject of great interest to all those who have watched the gradual development of the Dental profession in this country; and in clear and precise terms stated the share which had been taken in the movement by former Presidents of the Odontological Society. Such a thoughtful, considerate, and temperate account of the early history of the "Dental Movement," cannot but be of great value and interest, since it is most desirable that the rising generation of Dental Surgeons should know to whom they are indebted for the position which the profession now takes as a branch of general Surgery.

Westminster Hospital.

Mr. Charters White, whose name is so well known in connection with the Medical Microscopical Society, has been appointed Assistant Dental Surgeon to the Westminster Hospital.

An Error.

By an unfortunate mistake (which we take the earliest opportunity of rectifying), the President of the College of Surgeons was stated—in our last issue—to have taken the chair at the dinner held in celebration of the removal of the London Dental Hospital to Leicester Square. It should have been stated that the chair was occupied by Mr. Campbell de Morgan.

MEDICAL SOCIETY OF LONDON.

The meeting of the 7th inst., Dr. Sansom, vice-president, in the chair, was well attended, and was marked by an animated discussion on Dr. Routh's paper. The proceedings were opened by Mr. Royes Bell exhibiting a boy who had twice been operated on for Cleft Palate, the cleft extending through the whole of the soft part of the hard palate, together with hare-lip. The first operation—the ordinary one—being unsuccessful, the second was performed according to Sir William Fergusson's method, and was successful, union having taken place without any trouble, only a small opening remaining in front, which will probably soon close. Mr. Bryant asked if the latter operation was advantageous in cases where the hard palate was very vertical. Mr. Napier thought the great fault in these operations was the small hole generally left, and suggested that two small holes should be made on each side of the central one, so as to facilitate the closing of the latter, as the great point was to get union all along the median line. Mr. Royes Bell, in replying, said the cases mentioned by Mr. Bryant were very difficult, but he had seen them successfully operated on by Sir W. Fergusson's method.—*The Lancet.*

ON THE

MICROSCOPICAL STRUCTURE OF FOSSIL TEETH

FROM THE NORTHUMBERLAND TRUE COAL MEASURES.

By W. J. BARKAS, M.R.C.S.E., L.R.C.P. London.

CHAPTER XIV.

[*Continued from p.* 364.]

GENUS. ACROLEPIS (AGASSIZ).

This genus is essentially Palæozoic, having existed only during the Carboniferous and Permian ages. It has been described by most palæontologists, but their descriptions are very defective, arising principally from the fragmentary state in which the fishes are generally obtained. Agassiz founded this genus, and there has not been any work published since his time that gives a greater detail of its characters than exists in his "Poissons Fossiles." This celebrated palæontologist classified it with Pygopterus, among the Sauroids, but this arrangement is evidently incorrect, for Megalichthys was also placed by him in the same sub-order, the scales, teeth, &c., of which, did not possess the slightest similarity to those parts of Pygopterus and Acrolepis. Tacitly, however, all palæontologists that retain Agassiz' classification have, since the above work appeared, removed Pygopterus and Acrolepis from the Sauroids, and arranged them with Palæoniscus and Cycloptychius among the Lepidoids, a family nearly synonymous with the Lepidosteidæ of Huxley. This, I take it, has arisen merely from the knowledge that we have since gained that the teeth of these fishes are tipped, and that their scales are rhomboidal in shape; these characters alone, however, are not a satisfactory test of the family under which they should be classified. Through the kindness of Mr. T. Atthey, Mr. Dinning, and the Curator of the Newcastle-on-Tyne Museum, I have been favoured with a view of the Permian fishes in their possession, and I find that their specimens of Acrolepis possess all the characters assigned to the Lepidosteidæ by Huxley, also that it probably pertains to the sub-family Lepidostini. There are twelve species of this genus, two are Carboniferous, eight Permian, and one doubtful, there is also a species named by Eichwald, and said by him to be Devonian; I am inclined to think this extremely doubtful, because no other palæon-

tologist mentions the discovery of an Acrolepis in that formation. The Carboniferous and Permian varieties do not belong exclusively to the formations in which I have placed them, for some are found in both, but more frequently in the one named than in the other. The general characters belonging to this genus are as follows:—it varies in length from two inches to one foot and a half; greatest depth is between the pectoral and ventral fins, from whence it gradually tapers towards the tail; tail strongly heterocercal; fins large, and all about the same size, pectoral fins non-lobate, dorsal fin is situated directly over the space between the anal and ventral fins; fulcral scales are arranged along the anterior margins of the pectoral, ventral, and dorsal fins; scales rhomboidal in form and marked with broad, waving, longitudinal grooves, and free from pitting, the thoracic scales articulate with each other as they do in Palæoniscus; head obtuse; orbit placed far forwards; a preoperculum; teeth arranged in jaws in two rows, the internal teeth being large, smooth, conical, pointed, and about $\frac{1}{15}$ of an inch in length, and occasionally slightly bent near the apex, the external teeth are minute, but irregular in their height; branchiostegal rays many and enamelled; no trace of an endo-skeleton. This summing up of the general characters applies to the Marl Slate species especially, but there can be no doubt that Coal Measure species will possess the same characters; unfortunately it has never been obtained from the latter formation in a perfect state, the scales, jaws, &c., being found lying detached in the shale.

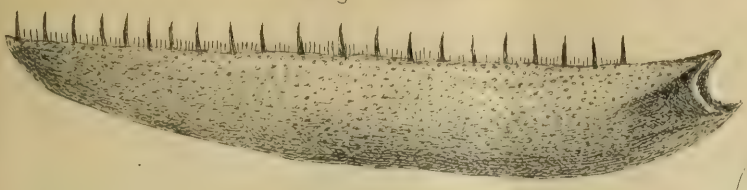
The jaws, according to my researches, consist of a superior maxilla and a mandible; I have never been able to detect any trace of a pre-maxilla, nor yet has any other palæontologist been successful in discovering it, though many of them suppose that it must have one. When the jaws are in *situ* in the head, the superior maxilla is seen to project beyond the mandible. In form, the mandible appears to be merely an enlarged mandible of Palæoniscus; the maxilla also probably resembles the maxilla of that fish, but I have never observed the broad rounded posterior portion in Acrolepis, because this bone is generally much broken, or is covered by the head bones that have been crushed upon it; from these causes the maxilla of Acrolepis generally appears to resemble the mandible. The mandible

evidently articulates with the head by a ball and socket joint, the socket being in the posterior extremity of the jaw itself; this is very well shewn in Fig. LXV., a mandible from the Northumberland Coal Measures in my possession, and it is the most perfect jaw that I have seen, either from the Coal Measures or from the Marl Slate. The external surfaces of these jaws are covered with numerous minute, but coarse tubercles arranged irregularly, occasionally these tubercles coalesce to form short ridges, which, however, do not run in any particular direction. The teeth are arranged along the alveolar borders of the maxilla and mandible in two rows, an inner row of laniary teeth, and an outer one of minute teeth. The laniary teeth are arranged at about equal distances from each other, and are uniform in height, measuring one-eighth of an inch in the mandible I have figured; the minute teeth are not arranged so regularly, being more or less crowded at different parts, they are also unequal in height like the corresponding teeth of Pygopterus. All the teeth, whether large or small, are conical and sharp-pointed, but they are not so curved as in the other genera of this family; in my drawing of the mandible the teeth appear straight, but they are not quite so really, generally possessing a slight curve near the apex, as is clearly exhibited in Fig. LXVI., where the right hand minute tooth has been cut parallel to its curve; sometimes these teeth are as much curved as in the other genera.

I have now detailed the general external characters of the fish Acrolepis, and it will be observed that there are exceedingly few points of difference between it and Pygopterus, in fact the only test that can be depended upon, is the difference of the markings on the jaws and scales; Acrolepis, however, is, generally speaking, a thicker and shorter fish than Pygopterus.

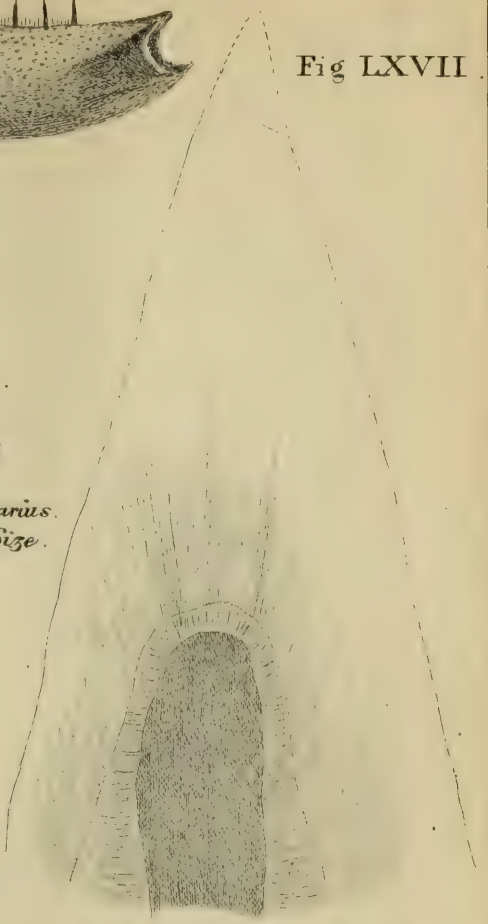
The minute structure of the jaws and teeth is also exceedingly similar to that of the jaws and teeth of Palæoniscus and Pygopterus, there are, however, one or two points that may enable us to distinguish Acrolepis, microscopically, from either of the two above genera. The substance of the jaw is distinctly osseous, and the vascular canals are regular in diameter, and branch and anastomose occasionally; in the tissue, intervening between the canals, are arranged lacunæ with their radiating canaliculi; the

Fig LXV.



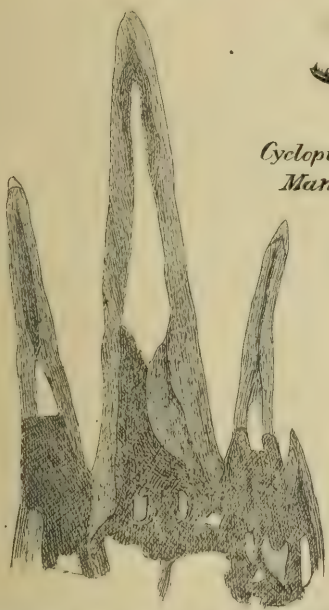
Acrolepis Mandible.
Nat Size.

Fig LXVII.



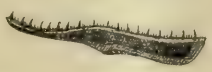
Acrolepis. Tip of tooth.
Vertical Section. Magnified 250 diams.

Fig LXVI.



Acrolepis. Large & Small Teeth.
Vertical Section. Magnified 10 diam.

Fig LXVIII.



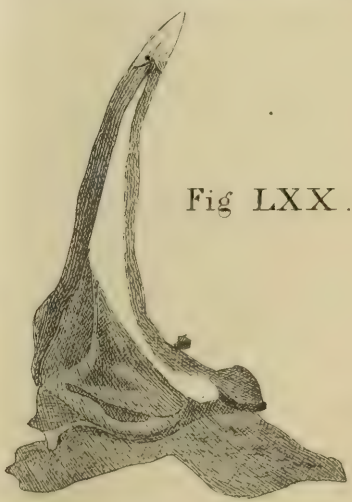
Cycloptychius Carbonarius.
Mandible. Nat Size.

Fig LXIX.



Cycloptychius Carbonarius.
Maxilla. Nat Size.

Fig LXX.



Cycloptychius Carbonarius. Portion of Jaw with tooth
Vertical Section. Magnified 30 diam.

T. Bessent, lith, 29, Essex S.t, Strand.

lacunæ are very irregular in shape, being sometimes almost oval and sometimes very oblong; they also vary much in size, in my sections the tissue is filled with lacunæ measuring one two-thousand-five-hundredth of an inch in breadth, and one seven-hundred-and-fiftieth of an inch in length. The tissue itself is apparently structureless.

The microscopic characters of the teeth of this fish I do not need to dwell upon at any length, because the description given in the November number of the *Review* of the minute structure of the teeth of Palæoniscus, will answer perfectly well if we increase the diameter of the tubules, for in Acrolepis they measure from one ten-thousandth to one fifteen-thousandth of an inch at their origin, and as a consequence of this largeness, the finer ramifications near the external surface of the dentine are more distinctly visible: these fine terminal branches appear to terminate just before reaching the periphery in a boundary formed of minute cells, the tissue beyond this boundary is structureless, even under 1,300 diameters, yet it cannot be considered as enamel, because it possesses exactly the same light brown colour as the tubular dentine; no doubt, originally, this structureless dentine possessed fine tubules, but they may have been lost during the process of fossilization. The enamel tip of this tooth I shall describe a little more fully than I did that of Palæoniscus, because we can examine it more easily on account of its larger size. The enamel, or ganoine tip is composed of a clear, perfectly transparent, homogeneous tissue, in which ramify numerous tubules, which are continuations of the tubules that have arisen from the pulp cavity and pursued their course through the dentine that intervenes between that cavity and the tip. The course of the tubules, when they have entered the enamel tip, tends to be parallel to the long axis of the tooth, those in the centre being quite parallel. As the tubules proceed into the enamel they become finer and finer, and ultimately disappear, very few of them reaching the periphery apparently; they do not, however, terminate in a boundary as they do in the dentine. Here again I do not doubt that the tubules do reach the external surface, but it is impossible to trace them on account of their minuteness and the clearness of the tissue in which they ramify. Those tubules that are visible, are rendered strikingly so by the dark carbonaceous matter contained in

their interior contrasting with the clear tissue in which they are imbedded. In Fig. LXVII. the minute structure of the tip is well pourtrayed; its form, however, has been somewhat destroyed in making the section, the extreme tip having been rubbed away; it should be acutely pointed; I have added dotted lines to shew the extent to which the enamel is wanting.

The body of the tooth is sometimes coated with enamel in a very thin layer. The pulp cavity follows the contour of the tooth, and is continuous with the vascular canals in the bony substance of the jaw.

GENUS. GYROLEPIS (AGASSIZ).

Concerning Gyrolepis there is very little known and still less has been published. It was founded by Agassiz upon some scales that were obtained from the Old Red Sandstone and the Muschelkalk, but since his description appeared, the scales have been discovered in the Coal Measures. While Agassiz was prosecuting his researches among the Muschelkalk specimens, he came upon two jaws placed in close proximity to some of the scales he had named Gyrolepis, upon this he inferred that these jaws pertained to the same fish as the scales; these so-called jaws of Gyrolepis, however, possessed teeth having the form of obtuse cones with rounded apices, and which were disposed upon the whole of the alveolar border of the jaw; as these characters are distinctly Pycnodont, Agassiz inferred that Gyrolepis belonged to that family, and he classed it with Platysomus. Since the time of Agassiz, more knowledge has been obtained concerning this genus, but very little of these new acquirements have been published. Mr. Atthey has mentioned, incidentally, that its teeth are tipped, and Mr. T. P. Barkas, F.G.S., has figured the scales and briefly described the jaws; although this is all that has been stated publicly, it has been quietly removed by Coal Measure palæontologists from the Pycnodonts of Agassiz to the Lepidoids, on account of the great similarity of its jaws, teeth, and scales to those parts of Pygopterus and Acrolepis. The scales of Gyrolepis are exactly similar in form, and nearly so in size, to those of Pygopterus and Acrolepis, but they differ in the markings on the external enamelled surface; according to Mr. Barkas, these markings are composed of light ridges placed concentrically, and

running parallel to the sides of the scales, and Professor Agassiz states that the ridges are sometimes arranged obliquely and ramify irregularly. While referring to the scales, I may state that there is a rumour that there is no such fish as Gyrolepis, but that the scales so-called really belong to Acrolepis, the latter fish being said to possess two kinds of scales, those now called Acrolepis, and those named Gyrolepis, these two different scales being situated on different parts of one body. This may be so, but when I describe the jaws of Gyrolepis, it will be seen they differ externally and internally from those of Acrolepis. However I shall retain them separately in these papers, leaving the matter as an open question. There is some hope, fortunately, of this doubt being settled soon, for I learn that Professor Traquair is at present studying the different genera of this family, with a view to publishing his researches.

The jaws of Gyrolepis resemble those of Pygopterus and Acrolepis in their form and method of articulation with the head bones, but their external enamelled surface is differently marked, the markings presenting two characters, one consists of fine ridges running parallel to the alveolar border, these are situated along the upper half of the surface, the other, situated on the lower half, is formed of coarse tubercles arranged irregularly; these characters are well shewn in a mandible in my possession, which, unfortunately, wants its articular extremity. The teeth are conical, and acutely pointed, and are arranged along the alveolar border in two rows, an outer row of irregularly sized minute teeth, and an inner row of larger laniary teeth; these teeth agree in length with those of Pygopterus, and possess a similar amount of curvation, in this respect differing from the teeth of Acrolepis. It will be observed that the characters of the teeth that I have detailed, are quite the reverse of those found in the jaws obtained from the Muschelkalk, and described by Agassiz; Gyrolepis cannot, therefore, belong to the Pycnodonts, as suggested by that author.

Under the microscope, a vertical section of a tooth shews that the teeth are tipped with a point of enamel, exactly in the same manner as are the teeth of Pygopterus and Acrolepis. The pulp cavity, the thickness of the dentine, and the occasional presence of a layer of enamel, also

agree with those parts of the teeth of the above-named genera. The calcigerous tubules are arranged as are those in Pygopterus, and have exactly the same diameter at their origin.

The tissue of the jaw is composed of a homogeneous substance, freely permeated by vascular canals, which branch and anastomose plentifully, and are continuous with the pulp cavities of the teeth on the alveolar border. I cannot detect any lacunæ in my sections, the structure thus approaches more nearly to the tissue of the jaw of Pygopterus than to that of Acrolepis.

All the characters that I have just detailed as pertaining to Gyrolepis, tend to shew that it belongs to the Lepidosteidæ of Huxley, but as I do not know anything about its fins, tail, branchiostegal rays, or operculæ, I cannot classify it into either of the sub-families. With regard to the distinctness of the genus, I am much inclined to think that what evidence I have gathered, goes to prove that Gyrolepis is distinct from Acrolepis, though they are, undoubtedly, very closely allied.

ON SEPARATING TEETH PREPARATORY TO FILLING,

By T. WILSON HOGUE, D.M.D., Harvard University.

In the treatment of most interstitial cavities, wide permanent separations, it seems to me, give the best results; primarily by the introduction of better fillings, and in the second place, by leaving the teeth in a condition less predisposed to the recurrence of caries.

I would except two classes of cavities, when they occur in individuals under thirty years of age, free from any scorbutic tendency, and who have never suffered from the use of mercurial medicines.

I. Small cavities in incisor and canine teeth, encroaching more upon the labial than palatine surfaces: such as we cannot fill to advantage from behind.

II. Small cavities in well rounded bicuspids, situated exactly at the point of contact with the neighbouring teeth, and which in no way involves the grinding surface.

There are also some few special cases, which can scarcely be classified, where wedging is preferable; owing to some peculiarity of form, or in the six front teeth, to a marked

inward inclination. In the large majority of cases, the superior incisors and canines can be filled with perfect ease and no disfigurement, without wedging apart. This is done by passing one of Froid's No. 1 or 2 separating files between the teeth, and opening very freely from the inside with Morrison's Dental Engine, using cone shaped or round corundum burs. In this way the cavities can be exposed with ease and rapidity; and by keeping the corundum wet and cool, the patient will suffer little pain. It is advisable to put a rubber washer on the wire of the bur, to keep the water from trickling into the hand piece of the engine. Much freer access can be obtained, if the bur is allowed to play against two teeth, and in most cases this is the best practice.

Amongst the advantages of this method are these. The cavities can at once be excavated and plugged thoroughly. The teeth, not having been separated by rubber or a wooden wedge, are insensible to pressure. The fillings can at any time be easily inspected: they can be kept free from prolonged contact with food: and patients are always grateful at being spared the pain and annoyance of wearing rubber for days between the teeth. Chisels of very hard temper, with a flat instead of a bevelled cutting edge, and which remove the enamel and dentine by powdering them away, are invaluable in making these separations; more especially when it is desirable to cut away part of one tooth only. The bicuspids and molars can be separated by corundum discs, more rapidly and with less discomfort to the patient than by the file. It is absolutely necessary to have some arrangement attached to the hand-piece of the engine, to keep the wheel wet and cool, because the pain caused when it becomes heated is very considerable. In small mouths the space between the wisdom tooth and second molar, both in the superior and inferior maxilla, is more readily enlarged by filing. When separating the bicuspids and molars, in all cases the sides of the teeth should be left perpendicular: v shaped spaces are to be avoided, as in the latter, food causes much more discomfort than in the former. A wide separation between any of the teeth used in mastication, is undoubtedly always, more or less, of a discomfort for some little time after it is made; the gum being tender the pressure of food on it causing uneasiness. I have never, however, known this tenderness

and discomfort to last more than two months. The separations must be very free, which will allow of matrices being used, and they will be found invaluable in filling large compound cavities with gold. A box-wood disc, charged with powder, is very useful in polishing the surfaces both of the filling and the tooth. Not the least satisfactory part of this method is, that the fillings can at any time be thoroughly inspected, and an accurate opinion given regarding the state of the teeth. After the grinding teeth have been separated in this manner, it is necessary for comfort, to make frequent use of the tooth-pick or silk ligature, and it is perhaps advisable before treating the teeth in this way, to give the patient the option of having them freely separated and very durably plugged, or wedged and less lastingly preserved. It seems to me the American School of Dentistry fails to some extent, by using the wedge almost exclusively. I have over and over again seen high-class fillings, introduced by eminent dentists in that country, fail, solely from the teeth, after plugging, coming into too close contact. No doubt cleanliness will in some degree prevent this result, and so we may throw a share of the blame on the patient; but by making the separations very wide and permanent, to a certain extent, we compel the patient to cleanse the teeth after eating, and this is a great point gained. What appliances are now at our command to aid us in saving teeth? The rubber dam, Palmer's and Allen's clamps, the saliva pump, Palmer's napkin holders, automatic pluggers, matrices, and various improved forms of gold. If these are used with scrupulous care, and wide permanent separations made, carious teeth can be plugged and preserved with wonderful certainty.

Bournemouth.

Mr. J. C. Barnes, F.C.S., published a paper in the *Pharmaceutical Journal* for this month, on "The Preservative Effect of Chloroform upon Vegetable Infusions," &c. It is stated that not only is alcoholic fermentation prevented by chloroform, but when added in sufficient quantity to fresh milk, lactic fermentation is also arrested. It would be convenient, perhaps, to preserve milk in this manner, boiling the liquid before use, in order to drive off the chloroform. It is considered probable that solutions of acetate and citrate of ammonia, citric acid, lemon-juice, and many other substances may be preserved by chloroform. The idea was suggested to Mr. Barnes by Dr. G. Pritchard, Greenstreet, Kent.—*The Lancet.*

DISEASE OF THE ANTRUM.

By W. MERSON, L.D.S.R.C.S.

I send you the notes of a case which has recently occurred in my practice, possessing, I think some points of interest; although I do not presume to imagine there is anything new either in its cause or treatment, yet I feel that if practitioners sent notes of exceptional cases, our profession would the sooner attain that position which its well-wishers so earnestly desire.

A young lady, æt. 28, two years since, had a gold plate fitted over the fangs of the two upper incisor teeth; shortly afterwards she experienced great pain in that region, and an abscess formed over the apex of the fangs, which has discharged pus into the mouth ever since, she had constant pain, and on taking the least cold the face became very much swollen and the pain increased.

As the fangs were evidently the cause of the mischief I removed them very carefully (the patient being under nitrous oxide gas) there was considerable hæmorrhage, evidently from the rupture of one of the small palatine arteries, and a slight discharge of pus, the bones were greatly absorbed, and I could easily pass a large probe into the antrum. I ordered her—

℞ Ferri Ammonia Citratis gr. xxx ij.
Ammonia Carb. gr. xxiv.
Aqua ℥ v iij.

Two tablespoonfuls three times a day.

℞ Zinci Sulph. gr. v iij.
Morph. gr. ij.
Aqua ℥ v iij.

A tablespoonful to be added to an equal quantity of warm water, and injected with a glass syringe into the sinus every four hours.

Under this treatment she progressed favourably for about a week, when she complained of great pain in the nasal bones and frontal sinuses, I therefore substituted Potass Iodide gr. iij pro dosis, for the ammonia, and in a fortnight the cavity had healed, and she expressed herself free from pain, and feeling better than she had done for two years.

Delphi House, Bournemouth.

CRITICAL ABSTRACTS.

DR. OGSTON ON CONGENITAL MALFORMATIONS OF THE LOWER JAW.

(GLASGOW MEDICAL JOURNAL.)

(*Continued from page* 225.)

B. CONGENITAL UNILATERAL SMALLNESS OF THE LOWER JAW.

Dr. Ogston observes that only two cases of this variety are recorded in medical writings, but he (the author) is able to add the notes of another case.

The first case was published by Vrolik *(Op. Cit.)* The second by R. W. Smith, M.D., ("On Fractures in the Vicinity of Joints, and certain Accidental and Congenital Dislocations," Dublin, 1847); whilst the third case is that of a patient of Mr. De Lessert, dental surgeon, of Aberdeen, and now described for the first time by the author.

In Vrolik's case "the skull and lower jaw when prepared showed the following peculiarities. The cranium was not symmetrical, having a direction obliquely from right to left, so that on the left side the exterior was more convex and regular than the right side, which was, so to speak, flattened, and recovered its globular form only in the region of the parietal tuberosity, where it was even a little elevated. The face was also oblique. The orbital margins were compressed from above downwards, hiding the deeply placed eyes. The nasal bones were broad and convex. The superior maxillary bones were short and narrow. The inferior maxilla was so retracted that it scarcely reached half-way forwards on the palate. It had an abnormal shape, and was composed of only one bone, the right ramus of which was one-fourth longer than the left, rendering the whole maxilla oblique. The chin was not straight in the middle, but was deflected to the left side where it terminated in a point. At the external surface of the angle the bony margin was broad and turned outwards. At the posterior and internal surface, near the posterior maxillary foramen, a short and thick piece of bone was situated, though its nature was not easy to determine. The condyles were more broad than round, and were horizontal in direction. The coronoid processes were much everted. In the base of the cranium the following points were specially remarkable, viz., the broad and almost horizontal pterygoid processes, the very broad alæ majores of the sphenoid, and

the backward direction of the temporal bones, by all which the base of the skull was increased in length, and the occipital foramen pushed too much backwards and downwards.

"The size of the right lower maxilla is almost or nearly normal, that it would, if properly placed, occupy a normal position in regard to the right superior maxillary bone, and that it is mainly the brevity of the left lower maxilla which causes its deviation to the left of the mesial line, since it is compelled to contribute more than its due share to the completion of the circuit of the alveolar ridge. We have here to do with an asymmetrical skull, with deficient development of the left lower jaw (the right lower jaw being unaffected or less affected), a state of matters entitling the case to rank as a less marked example of those which I shall next adduce.

Dr. Smith, when engaged in making the *post mortem* examination of a man, aged 38, the subject of congenital idiocy, who died in the Hardwicke Hospital of bronchitis and gangrene of the lung, was struck with the peculiar deformity exhibited by his face. "The right side of the face was small and atrophic, presenting, in the situation of the zygoma, a concavity in place of a convexity, and, in the parotid space, a very distinct depression. The countenance was crooked; the right angle of the mouth was higher than the left; the right orbit was lower than the left orbit; the right superciliary arch less projecting, and the right eye less prominent. The right side of the face appeared sunk in, and the tip of the finger could be placed between the parotideal margin of the jaw and the front of the external auditory canal. The right masseter was atrophic; the right temporal and pterygoid muscles were smaller than those on the left side, but their muscular structure seemed normal. No appreciable difference existed between the nerves of the two sides of the face. On the affected side the external lateral ligament of the temporo-maxillary articulation was directed obliquely forwards instead of backwards, and was attached to an imperfect condyle, which was at least a quarter of an inch separated from what should have been the glenoid cavity. Periosteum took the place of the cartilages of incrustation, and the inter-articular cartilage was absent. There was no capsular ligament. The right side of the maxillary bone was

smaller than the left, and was atrophied in every measurement from the symphysis backwards. The transverse diameter of the ramus was half an inch less than on the left side, and the right parotidean margin was half an inch shorter than on the other side. The lower margin of the right half presented a concavity at its posterior part; the angle was prominent and excurved; and the parotideal margin was thin and concave at its upper part, formed nearly a right angle with the body of the bone, and terminated above in a small curved process, directed nearly horizontally inwards, its superior surface being turned slightly outwards, and its inferior surface slightly inwards. This process, in form somewhat resembling the coracoid process of the scapula, was the only vestige of a condyle, but was destitute of cartilage. The external pterygoid muscle was attached to its anterior and inner part, and the external lateral ligament to its outer surface. The coronoid process was thin and small, and the sigmoid notch could scarcely be said to exist. On the right temporal bone the zygomatic process was arrested in development; the articular eminence was absent, and instead of it there was merely a flat surface destitute of cartilage. The superior or longitudinal root of the zygoma was present, and at the place where it normally meets the articular eminence or transverse root (in other words, at the tubercle of the zygoma), the temporal was joined to the malar bone, the suture connecting them being distant only half an inch from the circumference of the external auditory canal, while on the opposite side the interval amounted to an inch and a half. The glenoid cavity was absent, and in place of it was merely a flat, quadrilateral surface, the inner portion of which alone was concerned in the motions of the jaw, and presented a shallow sulcus antero-posterior in direction. This sulcus formed a segment of a large circle, in which the curved and atrophied condyle moved. The non-articulating portion of the right temporal bone posterior to the Glasserian fissure was not deformed, but the entire bone was smaller than its fellow, had no groove for the lateral sinus, and the right jugular foramen was scarcely half the size of that on the opposite side. The malar bone was small, thin, and concave on its facial surfaces but possessed a zygomatic process of extraordinary length, which formed the entire zygomatic arch. The

right zygomatic fossa was a quarter of an inch narrower than the left. The right superior maxilla was smaller than natural, its alveolar border did not descend so low as that of the opposite bone, and the suture by which it was united to its fellow did not occupy the mesial line, so that the palate did not consist of two symmetrical portions, but the suture was directed obliquely from before backwards, and from right to left. The motions of the lower jaw, especially lateral motion, were more extensive than normal, the right ramus being drawn backwards and forwards during their performance. During life the patient was observed to be constantly performing these motions, and the right side of his face was continually affected with spasmodic twitches.

"Smith has classed this case among the congenital dislocations such as are found affecting the joints of the shoulder, wrist, and hip, and it has long been quoted as the only well-described case of congenital dislocation of the lower jaw which exists. But it has been doubted whether the name 'Congenital Dislocation' rightly expresses its real nature; and considering how little we know of the causes of congenital luxations, or whether the displacement of the bones is the main feature of such, it must be admitted that the title has been badly chosen."

From the nature of the foregoing case, Dr. Ogston considers that it may be most correctly classified as an instance of arrested development, rather, than as a case of luxation, under which Professor Smith has placed it.

"In Mr. De Lessert's case, on looking at the face (the patient is an unmarried female, æt. 40), we find the most striking feature observable is a strongly marked inequality of the two sides of the face below the level of the eyes. The left malar bone is in size only four-fifths of that of the right malar bone, and the left side of the face beneath it is so diminutive that the measurement from the angle of the left lower jaw to the lower border of the left zygoma (or, in other words, the length of the posterior border of the left ascending ramus) is one and a-half inches, as against two and a-half inches on the right side. There exists a hollow where the prominence of the condyle of the left lower jaw should be felt. The left coronoid process, as far as can be ascertained by the touch, is small, but in tolerably perfect condition. The breadth of the left ascending ramus is one

inch, that of the right is one and a-half inches. The left horizontal ramus is smaller than the right, its length being three inches, while the right ramus is four and three quarter inches. The perpendicular depth of the horizontal rami is one and a-quarter inches on the left, and one and three quarter inches on the right side. The central line of the jaw at the lower incisor teeth deviates a quarter of an inch to the left, the deviation at the lower border of the symphysis being one inch to the left, so that the left half of the bone is smaller in proportion along its lower than its upper or dental margin."

OAKLEY COLES.

UPON A CASE OF SPONTANEOUS ELIMINATION OF TWO INCISORS IN A NEWLY-BORN INFANT.

DR. GUENIOT.

Chirugien de l'hospice des Enfants Assistés, Professor agrégé de la Faculté de Medicine.

(BULLETIN DE THÉRAPEUTIQUE.)

I READ in the *Bulletin de Thérapeutique* (for the 15th December), an interesting account, by M. le docteur Masse, on the "extraordinary rapid evolution of a tooth in a child of six weeks old." As our science is above all constituted by the aid of comparison and reconciliation, will you allow me to relate here an analogous example that I observed in 1868, and which I brought before the Chirurgical Society in the course of the same year.

This is the text of my communication.

Singular phenomena in dentition, or spontaneous elimination of the two upper central incisors in a newly-born infant.

On the 10th of April, 1868, an infant of nine days, well formed, of ordinary development, and of the male sex, was brought to me at the Hospice des enfants Assistés, presenting the following symptoms: the upper lip, tumified, red, and painful, for about two-thirds of its centre, was the seat of a phlegmonous inflammation, which manifestly arose from a lesion of the gum. This in fact, in the part corresponding to the first left incisor, was partially mortified, and the blackish gangrenous remains involved the mucous membrane for fifteen centimetres, as far as the frænum of the lip. The bulb of the central incisor, laid bare by the loss of the tooth, which had taken place the evening before, made a voluminous elevation in this irregular and bloody wound. It was larger than a lentil seed, of a deep reddish brown, turgid, linguiform, and moderately sensitive. Nothing similar existed on the right side, and all the rest of the edge of the gum, whether upper or lower, were normal.

What could be the cause of this very singular phenomena? Was it gangrene which produced denudation of the tooth, and then determined its loss? or, on the contrary, was it not an abnormal work of elimination of this incisor which provoked mortification of the mucous membrane?

Notwithstanding the poverty of information, it appeared improbable to me that the child could have undergone, in the affected region, traumatismus sufficient to explain the existence of the gangrene. Besides, this etiology would not account for all the established symptoms. Thus the gangrene was too superficial to have attacked a tooth so deeply hidden in the alveolar depression; besides, the dental bulb made such a projection upon the edge of the mortified gum, that it was plain that the work of elimination would be favourable to its expulsion.

The little patient, born in the Clinical Hospital, of a mother who died of peritonitis the fourth day of her confinement, had over the whole surface of the body an epidermatous desqumation; the mammary glands, partially tumified, yielded on pressure a few drops of milk; the umbilicus was not completely cicatrised, and the genital parts were the seat of an erythematous rash, which extended to the thighs. Although it appeared to have suffered in its nutrition, the infant was neither restless nor troublesome, and, failing a nurse, willingly took the bottle. Under these circumstances it appeared to me that the loss of the incisor was probably the consequence of inflammation of the dental bulb, and that the gangrene of the gum was the result rather than the cause of the phenomenon.

This interpretation up to that time disputable, nevertheless soon received evident confirmation. In fact, on the following day, the 11th of April, I was present at the evolution, at the same work of elimination of the fellow tooth, that is to say, the right upper central incisor. The corresponding gum made an abnormal elevation, and formed a tumour as large as a pea, and pushed to the left the median line of the lip.

On the 12th this tumour had slightly augmented in volume; the gum was red, inflamed, and already pierced at one point by the inner angle of the edge of the tooth. Finally, on the morning of the 13th, the tooth dropped out after having traversed the gum, leaving bare the brownish voluminous bulb exactly like that of the first tooth expulsed, and like it moderately sensitive. It was projecting from the gum, and was in a manner strangulated at its fang by the opening of this last. It offered thus a striking analogy to the first rudiments of a plant when it bursts through the coverings of the seed, and commences to spread outwards. The precise point of the little wound in the gum did not correspond to the middle of the thickness of the alveolar border but its interior angle, which in the newly born is thin and edge-like. On the 14th, that is to say 24 hours after the elimination of the tooth, the bulb so bulky the night before had completely disappeared, and the opening in the gum resembled a very small linear opening. This time no mortification was produced with the exception of that of the bulb, whlch, doubtless, was destroyed by gangrene. I did not discover any traces of suppuration.

As to the gangrenous wound resulting from the elimination of the first tooth or left incisor, although complicated and much more extended than the above, it behaved nevertheless with great simplicity. Thirty-six hours after the loss of the tooth the bulb had disappeared, without leaving any traces behind; poultices applied to the lip promptly relieved the inflammation, and the gum wound was quickly cleansed, but only after the right incisor had come out.

In short, by the 16th of April, the cure seemed to me sufficiently advanced for the child to be left to the care of the nurse, and I signed the order for its departure to the country.

The two expelled teeth were of precisely the same conformation. They

were alike symmetrical, and did not differ from the teeth of newborn infants, which are concealed in the depths of the alveolus. Completely destitute of fangs they terminated with the crown, which was largely excavated. They thus represented two solid shells composed of dentine, and clothed over their free half with a fine layer of enamel (chapeaux de dentine.)

I am not aware whether facts like the preceeding have been made known ; the thing is certainly probable. But if we except the five cases published by Dr. Shore in the *Gazette Médicale de Paris* of the year 1859, which approach them in many particulars, the observations are extremely rare ; for the special authors that I have consulted do not even contain analogous cases. My colleague at the hospital—M. Parrot—to whom I showed the little patient, had never seen anything of the kind ; and Dr. Magitot, notwithstanding his study of the subject, did not know of any similar. Of the five facts briefly related by Dr. Shore, four consist of expulsion of the incisor teeth in children aged one month to six weeks, all of whom succumbed to affections of the viscera. The autopsy showed proof of the absence of all dental bulb in the affected alveolus. In the fifth, a child aged only a fortnight, the two upper incisors were expelled with their bulb after a kind of alveolar abscess, which for some time had suppurated through the left nostril. It may be seen that in the first four cases the visceral disease complicated the buccal affection, and in the fifth a severe local lesion might explain sufficiently the inflammation of the bulb, the loss of the tooth, and the alterations frequently established of the maxillary bone.

In my little patient it was not thus. The lesion was isolated, independent of all visceral affection, and once the two teeth expelled, the wounds rapidly cicatrised. The complete evolution of the work of expulsion well established by the second tooth does not permit a doubt that the case was true elimination of the two upper central incisors, a spontaneous elimination having a great resemblance to that which would take place if a foreign body were accidentally introduced into the tissues. The enlargement and inflammation of the bulb appear to have been the immediate agents of this expulsion.

As to the cause of the inflammation of the bulb, I am led to think that it was the result of hypertrophy or abnormal situation of the germ outside the alveolar depression. In fact, the dental bulb, covered with its cap of dentine, did not become erupted in the thickness of the edge of the gum, but at the anterior angle of this edge ; moreover, that the little tumour formed by the propulsion of the tooth before the gum was pierced upon the anterior or latial surface of the alveolar mucous membrane, and not upon the mucous membrane of the gum properly speaking. Superficially placed outside the ante-maxillary mucous membrane and beyond the alveolus, the bulb of each of the incisors should then, according to this hypothesis, undergo severe hyperemia or even real inflammation, during the period when, in the newly born, the epidermis forms, and the lactiferous flow of the breasts takes place.

ROYAL COLLEGE OF SURGEONS.

George H. Crowther, son of G. H. Crowther, D.D.S., Bond Street, Wakefield, passed his preliminary examination for the diploma of Member of the Royal College of Surgeons, held on the 22nd, 23rd, and 24th, of December last, at the University of London.

DILACERATION, OR FLEXION OF THE CROWN OF A LEFT SUPERIOR CENTRAL INCISOR.

BY J. H. M'QUILLEN, M.D., D.D.S.,
PROFESSOR OF PHYSIOLOGY IN THE PHILADELPHIA DENTAL COLLEGE.

(PENNSYLVANIA JOURNAL OF DENTAL SCIENCE.)

(A communication presented to the Biological and Microscopical Section of the Academy of Natural Sciences of Philadelphia.)

A UNIQUE abnormal specimen was recently sent to me by J. M. Comegys, M.D., of St. Albans, Vermont: a left superior central incisor, the crown of which was bent at right angles with the root. The enamel on the labial side is rough, defective in structure, and having a number of brownish depressed spots on it, while at the neck there is a marked concavity, with the dentine exposed, and presenting the same brownish appearance. On the palatine surface the enamel is more perfect in appearance and structure. The root is constricted at its neck, stunted in growth, and does not compare in size with the crown. The history of the case presented by Dr. Comegys is as follows:—The patient from whom the tooth was removed, when a child four years of age, fell and knocked out the left superior deciduous incisor, sustaining at the same time some injury of the surrounding parts. Several years passed over, and all the permanent teeth with the exception of the left superior central incisor made their appearance in due time, but being very defective in structure they were removed and an artificial denture inserted. After wearing this a short period, the patient noticed a fungous or spongy growth of the gum near the centre of the upper jaw; on incising this a hard substance was found, which was pronounced to be a portion of the alveolar process. Suffering continued annoyance from this protuberance, the patient called upon another operator, who also regarding it as a piece of the alveolar process, made an unsuccessful effort to remove it, and the patient at last coming under the care of Dr. Comegys, he extracted it.

The specimen illustrates a condition which John Tomes, F.R.S.,* was the first to direct attention to, and which he

* Dental Physiology and Surgery, by John Tomes. Philadelphia, Lindsay & Blakiston, 1853, p. 191.

A System of Dental Surgery, by John Tomes, F.R.S. Philadelphia, Lindsay & Blakiston, 1859, pp. 197 and 280.

describes as dilaceration of partly-developed teeth from the formative pulp. The history of this case is manifestly in support of the explanation presented by Mr. Tomes of the manner in which this abnormal condition is induced, viz.: that the peculiar relation which the crown bears to the root is due to the fact that by mechanical violence at a period when the crown of the permanent incisor was partly calcified its position in the jaw was changed so that it was turned outwards or inwards, whilst the pulp being uninjured, the development of the root continued after the accident, with a permanent displacement of the crown.

Prof. Wedl,† of Vienna, considers that the term "dilaceration was not well chosen;" and his objection is a valid one if the literal derivation (*dis*, apart, and *lacero*, to rend), a rending in two, is applied to the condition. He proposes, in place of this term, flexion or torsion of the crown. While admitting that external mechanical influences such as a blow, kick, or the like, apparently do give rise to flexion of the crown of a tooth during its formation, Prof. Wedl says, "Generally, however, patients are unable to recall any such occurrences;" and he regards "deficiency of space at the time when the crown is formed as the cause of the phenomenon, while during the subsequent expansion of the contracted space the root would be enabled to develop in its normal position." In examining a series of jaws prepared so as to show the deciduous set with the crowns of the permanent teeth in situ, and noticing the crowded and peculiar position of the latter, it is not at all surprising that the permanent teeth frequently on erupting assume irregular positions in the arch. Indeed, it is rather a matter of astonishment that they ever come in and form a regular and symmetrical arch. While recognizing this, and also the possibility that under some circumstances the abnormal position of a flexed tooth may be induced by the cause assigned by Prof. Wedl, his explanation does not seem to the writer to be as plausible or satisfactory as that offered by Mr. Tomes. The history of the case under consideration indicates that the position of the crown during the formative period was changed by mechanical violence, and

† The Pathology of the Teeth, by Carl Wedl, M.D., Professor of Histology in the University of Vienna. Translated from the German by W. E. Boardman, M.D., with Notes by T. B. Hitchcock, M.D., D.M.D. Philadelphia, Lindsay & Blakiston, 1872, p. 130.

it does not necessarily follow that patients who are unable to recall any such occurrences may not have similar experiences which have escaped their memory.

A case apparently in illustration of this, came under my direct notice several years ago. I was seated in a room, where a child four years of age was playing about, who fell and struck the right superior maxilla with considerable force against the edge of a table, cutting through the gum and the outer plate of the alveolus. Sixteen years have elapsed since the accident, and the right superior canine has failed to make its appearance. A very decided protuberance, however, exists on the inner margin of the alveolar process, opposite the place the tooth should have occupied, and it is reasonable to infer that this prominence is due to the presence of the crown of the unerupted canine, whose position was forcibly changed at the time of the accident. The citation of this case may prove of service in aiding others in forming a diagnosis of similar conditions.

Through the kindness of Dr. Geo. S. Allan, of New York, who some months ago placed in my hands several valuable sections of teeth prepared by him, I have had an opportunity of observing the microscopical appearance of a tooth in which flexion of the crown had occurred. One of the specimens is a longitudinal section of such a tooth, an incisor; and there is a marked derangement in the course of the dental tubuli. At the neck of the tooth where the bending occurs, the tubuli presents a crimped or crenated appearance, as if they had been thrown into this condition at the time of the accident, and then became permanently fixed by the addition of the calcareous constituents. A number of interglobular spaces will be observed in the immediate vicinity of the enamel, indicating the imperfect character of the dentinal structure.

LACTO-PHOSPHATE OF LIME.

TO THE EDITOR OF THE "DENTAL REGISTER."

PROF. J. TAFT:

DEAR SIR,—In answer to your inquiry as to the results of my experimental use of Lacto-Phosphate of Lime as a local application to exposed dental pulp, sensitive and softened dentine, I can only reiterate and reaffirm every-

thing which I have from time to time said to you in conversation on this subject. My faith in the correctness of the theory and efficacy of the agent is constantly increasing, and I have no doubt, as soon as it is more generally used, *not abused*, that it will rank as one of the most valuable of local applications for the production of specific effects, which has presented itself within the last decade.

Having for the last five or six years eagerly availed myself of everything offered or suggested as a rational agent for the protection of an exposed pulp, or for its restoration to health when diseased, I have of course tried many things; some of them upon the high recommendation of professional brethren upon whose judgment I relied, in preference to my own, notwithstanding that in point of theory I differed widely from them.

For instance, distrusting my own convictions, I under protest, as it were, experimented with oxychloride of zinc, for the protection of exposed pulp tissue, for I could not reconcile it with reason that the chloride of zinc, in strength unknown, said strength being regulated by the manufacturer solely with a view to expedite the setting of the cement and which habitually acts upon all animal tissue as an escharotic, should act beneficially or *even* harmlessly upon the delicate and highly vascular substance we speak of.

Chloride of zinc must be valuable to us as an escharotic, owing to its rapid destruction of morbid growths, etc., but this very property which it most surely possesses, should at once preclude all idea of using it as a nerve covering.

It is curious to look over the proceedings of societies, say of three or four years back, and read reports of wonderful success in saving teeth with this agent, and call to mind its general laudation for this purpose.

Well, it is now thought best to protect the pulp with something else, say the lining membrane of an egg shell, gold beaters' skin, etc., etc.

This repudiation of oxychloride of zinc as a *direct* and immediate application to pulp tissue should be gladly hailed by the public at large, as they are most nearly interested, as for ourselves, I feel that we have newly discovered a lost pathway, are again in the right track.

I found in the oxide of zinc a more genial friend to an exposed and sensitive pulp, and have used it experimentally,

mixed with plaster paris, sufficient to give it setting qualities. Felt greatly satisfied with the result, and when Dr. King, of Nashville, about two years since, called the attention of the Professsion to this very thing, I felt that a large step had been taken towards the lost path.

Having for years firmly believed that a pulp recently exposed and comparatively healthy is, in most cases, "doctored to death," and that the simplest and mildest treatment offers the best chance for the preservation of its vitality, I was prepared to hail with delight the introduction of the Lacto-Phosphate of Lime.

What have we in this preparation? We have in the first place a perfectly harmless, pain-relieving application for sensitive and softened dentine. Cases which now call for the application of nitric acid, or argt. nitric. Cases in which the lime salts are rapidly dissolved, leaving the animal frame work standing, and presenting that well known gelatinous condition of dentine, will, under reasonably favorable accompanying circumstances of constitution, harden and fill up with new deposits of lime salts, often after the second, third, or fourth application.

Were this the end of its efficacy, would it not be a valuable addition to our materia medica?

But this is not all, it is one of the best applications I have ever met with, for sensitive dentine, that sensitiveness, which can not well be overcome by rapid strokes or cuts of a sharp excavator. As a covering for an exposed tooth pulp it is invaluable, causing no pain in its application, rather subduing it, if any be present, and if the directions for its use, as set forth by Dr. J. E. Cravans, of Missouri, in the September No., 1873, of *Missouri Dental Journal*, page 347, are strictly followed, the result will surely satisfy any one whose expectations are not unreasonable.

I do not wish to assert that this agent is a "sure shot" in the hands of all who may choose to use it. It requires care and skill in its application, and time and patience to properly prepare a tooth for filling. Let him, therefore, who expects to get his tooth in order, fill it, and *pocket his fee, all in one sitting*, pass it by, it will be "too slow" for him.

But those of our brethren who have a real interest in the welfare of their fellow men, together with an earnest

desire for the advancement of dental science, will here have an opportunity of testing a beautiful theory, and with the hope of a most satisfactory issue.

I am truly glad that you have succeeded in having some of the Lacto-Phosphate of Lime prepared in Cincinnati. The maker's name, Prof. Vaughn, is a surety of a first rate article. Induce all your friends to give it an impartial, fair, and just trial, and ask them to report results.

Before I close, I ought to caution those who may wish to try it, to be as careful in its application, to keep the cavity as dry, as if they were preparing to fill the tooth with cohesive gold, always applying the rubber dam. Any mixture of the saliva with the paste injuring, if not destroying its efficacy.

You have my last correspondence with Dr. Cravans on this subject, this you may publish in full, if you like. To the gentleman just named, the profession is indebted as the originator of this method of treatment of exposed pulps, and that his theory may prove correct and its practice be the means of saving the vitality of many thousands of teeth is the sincere hope and wish of your friend,

REHWINKEL.

Chillicothe, June 24, 1874.

SOMETHING NEW (OR BELIEVED TO BE SO) IN DENTAL SURGERY.

Read before the Medical Society of London, November 16, 1874, *and published in the "Medical Times and Gazette."*

By WILLIAM DONALD NAPIER, M.R.C.S.

BESIDES many other advantages enjoyed by the Fellows of this Society, too obvious as well as too numerous to recount, it is, I cannot help thinking, especially in their favour that the rules by which their proceedings are controlled are sufficiently broad and elastic to admit of the consideration of any one of the almost countless branches of the subject to which it owes its name. But for this latitude, on which I have especial reason to congratulate myself this evening, I should have hesitated to tender for your consideration, at any rate without a prefatory apology, a paper connected with the practice of dental surgery.

The rapid advance in the practice of medicine and surgery that has been steadily and unceasingly exhibited even within the short period of our personal recollection is doubtless in some measure due to its subdivision into the component parts that are now made severally the subjects of individual study and special application, and it is a considerable encouragement to those whose immediate sphere of action is comparatively

limited to one branch of the widespreading system that their successes are recognised and esteemed, not as isolated instances of disconnected interest, but as tending to augment the aggregate importance of medical science.

The particular case of which my paper treats I believe to be rare, but not sufficiently so to justify my bringing it under your notice on the ground of singularity. I would rather beg your patient attention to a brief narrative of the means adopted for its treatment, which I have reason to think are devised and practised for the first time; and I shall be especially gratified if it proves to be of sufficient interest to provoke the discussion that is invaluable in the elicitation of relative truth, and the elucidation of the subject on which it is brought to bear in the spirit that animates the Fellows of this Society.

In May, 1873, I was consulted by an Indian officer in the prime of life, and in the enjoyment of good general health, impaired only by a condition of teeth that gave rise to a great amount of painful nervous irritation, interfered with his power of distinct articulation, and, in addition, considerably marred his personal appearance. Extremes of heat and cold, and the contact of sweets and acids, served to increase his discomfort, and to interfere in more than a slight degree with his enjoyment of life.

The casts which I have on the table will aid me in explaining the appearance of the mouth as it was when first presented to me, and will also be of assistance in illustrating the means I adopted for the relief of the patient; but before submitting them to your inspection, I should like to describe as accurately as I am able, in a few words, the impression produced on my mind by the abnormal condition of both the upper and lower jaw that I was called on to treat.

The teeth in both, and more markedly the six front ones, bore striking indications of deterioration by attrition, but as they failed to attain contact when the jaws were pressed together, it was plain that the loss of substance could not be attributed to their mutual action on each other. Now, although one of my objects in publishing this case is to elicit the opinions of others as to the primary cause of the condition alluded to, I may mention in passing that I am myself inclined to trace its existence to the effects of salivation by mercury, which this gentleman remembered having been subjected to, although so long ago that my inquiries did not at first recall the circumstance to his mind. Previous experience has led me to be especially careful to regard the antecedents of the malady, for I am of opinion that there are other phases of the subsequent action of mercury than those that it ordinarily presents and that are generally recognised.

John Hunter, in his work entitled "The Natural History of the Human Teeth," published in 1788, bears testimony to the existence of the disease, which he defines as "the decay of the teeth by denudation," but he at the same time distinctly states it to be his opinion that it is (I am quoting his own words) "an original disease in the teeth themselves, and not dependent upon accident, way of life, constitution, or any particular management." Joseph Fox, likewise, makes mention of it, and is disposed to think that it may be induced by some solvent quality in the saliva; whilst Thomas Bell, at the same time that he confesses his own inability to assign the effect to its true cause, condemns Fox's theory as "wholly at variance with the fact that certain teeth are more liable to it than others, as well as with the situation of its commencement, and the regularity of the direction in which its ravages are carried on." In later

works upon the treatment of the teeth, such as Mr. Tomes's, I have failed to discover any mention of this particular form of disease.

But to return to the narrative, from the direct course of which I have a little digressed, and with the purpose I have named.

In addition to the suffering consequent upon the morbid sensitiveness of the teeth, or rather what remained of them, to which I have already made allusion, an incalculable amount of chronic discomfort was inflicted by the peculiar form which they had assumed, causing them to resemble nothing to which I can compare them but a row of upright spikes so sharp and jagged that it was useless to try even to hope that the mouth could ever accommodate itself to them as occupants; whilst at the same time, the express stipulation made by their owner in the very first stage of my acquaintance with him—that he should under no circumstances be subjected either to the most trifling measure of pain, or to the influence of any anæsthetic whatever—rendered his chance of obtaining relief extremely hazardous.

He, indeed, went so far as candidly to assure me that he would prefer to endure his present distress rather than submit to any treatment that I could not first assure him would be absolutely painless; whilst, as I have already said, his prejudice against nitrous oxide gas and chloroform was far too vivid for me to attempt to overcome it by argument.

Under ordinary conditions the case presented no remarkable complications, and the course of procedure would be simple enough. The teeth would be filed down level with the gum, and each nerve withdrawn singly, either during a state of unconsciousness artificially induced, or, if the patient's courage and endurance were equal to the demand upon it, without deprivation of the sense of touch, preparatory to their being replaced by artificial substitutes. But, fettered as I was by the compact between us that I should desist from manipulation directly my patient was conscious of a sensation of pain, I must allow that I did not anticipate the first operation with the confidence that is so valuable an auxiliary in the attainment of success, being well aware that the withdrawal of the nerve of a tooth is capable of causing—and, indeed, so long as there is vitality, never fails to cause—the most exquisite pain to the subject.

In this instance I indulged a hope that the employment of the ether-spray might render me valuable assistance, and the result did not fall short of my anticipations; but I did not resort to it until I had, on the first occasion of operating, filed the tooth that I selected for experimental treatment as deeply as I was able to do in the ordinary manner, ceasing only when my patient betrayed a sense of discomfort. The application of the spray, judiciously handled by my friend Dr. R. Lee, of whose proffered assistance I had gladly availed myself, and on subsequent occasions, when I was unable to secure his services, the employment of a piece of cotton-wool dipped in ether and laid first on the tooth and then on the instrument, enabled me to continue the process until the nerve of the tooth, with artery, vein, &c., was exposed.

And it was at this moment that I put to the test of practice the theory that had suggested itself to my mind, as not only a possible solution of the difficulties by which I was somewhat hardly pressed, but as an enduring means of escape from the performance of an operation that has always appeared to me to be at variance with the first principles of surgical art. I mean the demolition of the nerve, which is, as you are doubtless aware, a practice of everyday occurrence, not always, I take it, justified by the

circumstances of the case. Here I had cogent reasons for refraining from the attempt, but it was no new thing for me to seek for a method of evading what I believed to be false in principle and defective in use.

If a nerve with the vessels that accompany it is qualified by its nature and position to convey vitality and afford nourishment to so dense a structure as the tooth, I hold it to be a fatal mistake to remove it so long as it is performing functions that you are entirely incapable of causing to be fulfilled without its assistance. And the result never fails to make silent protest against the unmerited treatment; for the tooth deprived of so important an adjunct as its internal supply of nutriment, eventually perishes—affording another proof, if an additional one were required, of the fact that nothing has been created in vain.

My object was to obtain a safe and efficient method of preservation in lieu of the destructive system which I so cordially deprecate, and it is for the success accomplished in this particular alone that I lay claim to the title of originality.

The process I pursued was as follows:—With a delicately cut pencil of hard hickory wood dipped in nitric acid, I very gently and very deliberately cauterised the exposed portion of the nerve in each tooth successively, which, rendering the surface insensate, enabled me to perfect my task of reducing the teeth to the level of the gums with a file, without inflicting on the patient any of the pain he so much dreaded.

It then remained only to replace the ejected members with artificial substitutes, in the use of which he enjoys a complete immunity from the various inconveniences that he had suffered from when in the state I first described to you, and of which the models afford ocular evidence. I think, therefore, that I may fairly assert that in the treatment of the foregoing case, which I have described as accurately as I am able, I may count on having at least perfected the subjugation of two formidable obstacles that lay between me and what alone I should care to call complete success. In the first instance I overcame the difficulty—no mean one, as it appeared to me at first sight—of painless manipulation; and in the second, I was able to do what was even more gratifying to myself: to prove the possibility of evading a practice which, though universally recognised as legitimate, I have long held to be in direct opposition to the spirit of the laws that guide us, and by so doing to bring myself a step nearer to the attainment of what we all strive for in doctrine as in practice—the art to retain what is sound and to reject only what is unprofitable.

Before concluding my paper, I should like to advert for a brief moment to the topic with which I opened it—one which has been with me the subject of grave and earnest consideration. I mean the recognition of the various sections into which the great system of medicine is rightly enough divided as "parts of a whole"—branches owing their vitality to the main stem, from which they derive nutrition and support.

I have been perhaps insensibly led to the study of the subject by my experience of the impediments that are occasioned in the paths of both by the line of demarcation that is supposed, and in many cases permitted, to exist between those practising the speciality in which I am myself engaged and those who follow simple medicine or simple surgery. I do not allude to any want of harmony between the men, but to what I am not, I hope, over-bold in defining as a want of mutual professional appreciation sanctioned by the system. I myself estimate daily at greater value every minute atom of the general knowledge that furthers my utility in my

special vocation, and in like degree I am tempted at times to regret the deficiency of men infinitely my superiors in mental capacity and attainments in that which would, I know, be of inestimable value to themselves.

Specialism must exist. It has been a spontaneous and, I believe, a healthy growth, consequent upon the expansion of science, the increase of population, the advancement of civilization. All that I would argue is, not that the specialist should cease to be a specialist, but that his preliminary knowledge should be as diffuse as though a clear and distinct perception might at any moment be demanded of him of other subjects than that which he may make his prevailing study. And, as it is necessarily in his education and training that the balance must be adjusted, I hold it to be extremely advantageous that they should be conducted on as comprehensive a system as possible. I have for this reason—whether rightly or wrongly, certainly conscientiously,—discountenanced what are termed "special hospitals," and I hope and believe that the day is not far distant when one roof will shelter all the various schools in which it is advisable that a young man should gain the knowledge that is to be the secret of his strength in days to come.

If each of our metropolitan hospitals were provided with a dental department, duly and fitly organised, and not, as at present, devoted principally to the study and practice of extraction only, the benefit would be incalculable, not only to the rising body of medical practitioners, but to the public. Caries of the teeth is of all diseases the most common to humanity, and all who practise the healing art should surely be capable of its treatment by remedial measures rather than by what ought to be the last resort, extraction. Among the crowd of students who throng the general hospital there are few who know with any approach to certainty where their lot in life will be cast, and it is for them to acquire, as far as possible, the instruction that will render them independent of the facilities that are afforded to the occupants of cities only.

To those gentlemen who may be summoned to practice their calling in remote counties a more thorough acquaintance with this subject would, I believe, be of greater importance than they are aware of; whilst to the many who are placed in charge of the men of the army and navy on foreign service it would be a means of increasing their income to no despicable extent, for to them alone have the civil population in many instances the opportunity of applying for assistance.

In my earnest desire to plead the cause of a science that has hardly, I think, received its due meed of attention, I have I fear, sir, trespassed full long on your time, but as my motives have not been wholly interested, I hope that I may be forgiven; and I would only remind those who may be induced to devote more of their time and thoughts to it, that they need hardly account that to be a wholly inglorious field for labour in which they may avow themselves to be fellow-workers with John Hunter.

A death from the simultaneous employment of Chloral and Chloroforum as an anæsthetic has within the last month taken place in France. The patient was being operated upon for ovarian tumour.

REPORTS OF SOCIETIES.

ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

ORDINARY MONTHLY MEETING, FEBRUARY 1ST, 1875.

The President, J. TOMES, ESQ., F.R.S., in the Chair.

After the usual preliminary business had been disposed of—

The PRESIDENT delivered an address, in the course of which he returned his sincere thanks to the members for the cordial reception that had been accorded to him on his assuming the office of President for the second time. He then sketched the rise and progress of Dental Surgery, and referred, in complimentary terms, to the valuable services rendered by many of his predecessors.

Mr. C. J. FOX presented a model of a lower jaw, from which a tooth had, by mistake, been extracted some 18 months ago. It had been replaced, and had remained in the jaw ever since, without occasioning any trouble or pain to the patient. He also handed, for inspection, a plate which had been brought to him by a medical friend. The advantage gained by wearing the plate was, that the whole of the surface rested upon the mouth and prevented that rocking which sometimes took place when the plate was suspended by a rubber disc. He also exhibited a tooth with a crystallized gold filling made by Dr. Leslie. It had been steeped in ink for a week, and he intended to make a section of it.

Dr. LESLIE said that the gold filling had been the result of a great many experiments on his part. It had always been his anxious desire to produce an article that could be put into the tooth easily, and that would work very kindly and very soft, and would yield to lateral pressure, and that would more resemble an amalgam. The filling he had produced had the double quality of being perfectly soft and perfectly cohesive. It differed from all other forms of that preparation of gold, and took a better and more desirable shape for dental purposes. He had filled a large molar tooth with that preparation almost twelve months ago, and had been satisfied with how it had worn. At the same time he thought that upon the character and density of the tooth depended largely the ultimate success of the filling, whether of metallic or non-metallic nature. He had submitted the gold to a moisture test, and had found it perfectly satisfactory. The tooth exhibited by Mr. Fox had been for about a week immersed in ink, and although the instruments he had were insufficient to reach the exact point where the gold came in contact with the dentine, he was sanguine that there would be found no appearance of ink there. He desired to speak with modesty in the matter, but he thought that gold in its crystalline form was the true form in which it should be used for filling teeth. Since last meeting he had shewn Professor Tyndall a specimen of the gold. He cut it with his knife and was very much pleased to see the density of the gold.

Mr. C. S. TOMES said, that having made a large number of experiments with cohesive gold, he considered the result arrived at by Dr. Leslie was very

successful. From experience he had found that it was difficult to make a water-tight filling with cohesive gold. Everything, however, depended on the ink that was used. An ink, such as Draper's dycholic ink, would penetrate dycholic where other inks would not, because it was a perfect solution, whereas, other inks generally consisted of solid particles in suspension. Mr. Hubank and himself had been making experiments in this direction, the results of which they hoped to communicate to the future meeting of the Society.

Mr. OAKLEY COLES then read a paper on Dentifrices, by Dr. J. B. Rottenstein, of Paris, of which the following is a brief extract.

Dr. Rottenstein commenced by pointing out the value of prophylactic measures as applied to the teeth, and urged the importance of arriving at the best means of preventing caries, rather than simply being contented with perfect and remedial measures when caries had already set in.

The author then noticed the literature of the subject of his paper, and gave instances from Hippocrates to Pierre Fourchard, showing the interest which both ancient and modern writers had taken in dentifrices, illustrating the matter by quotations from Martial, Ovid, and other classic writers. Passing on to the cause of caries, and the influence of the leptothrix buccallis as an active agent in the production of dental diseases, the author discussed the relative value of various agents in arresting the progress of decay, and checking or arresting the development and growth of the fungoid growths formed in the mouth.

In conclusion Dr. Rottenstein expressed his great faith in the value of soap as a prophylactic agent, and the use of the permanganate of potash as a disinfectant.

The PRESIDENT requested that any members who intended to take part in the discussion on the paper, would confine themselves to the more immediate subject, implied by the title, namely—dentifrices, and the best manner of using them.

Mr. WHITE agreed with Dr. Rottenstein that soap was very useful as a dentifrice. It was, perhaps, the safest thing that could be used, and he found that many patients used nothing else. For some years past he had been accustomed to recommend to his patients a dentifrice whose basis was soap, combined with myrrh and very little pumice, but it should be used very cautiously. He had seen a gentleman the other week, who was accustomed to use it twice a day, but he had found his enamel was getting ridged and very thin, and he had, therefore, decidedly condemned the use of it so often as that, although it stood to reason that soap would neutralize any acid that might lodge in the crevices of the teeth. Although Dr. Rottenstein's paper in a scientific point of view, was rather below the average of those read before the members, still, it would be of great practical value to the dental profession.

Mr. C. VASEY said that sometime ago he had been led to make a few experiments with pumice powder. He had mounted a tooth in artificial gum, and brushed it with an ordinary tooth brush and pumice of different qualities for 15 minutes, when he used the coarsest of powder very little effect was produced upon the tooth, but when he used the levigated pumice, he found that in fifteen minutes it cut through the hard dentine. He did not think that a better

dentifrice could be recommended than that formed of precipitate of chalk with a few grains of myrrh which formed a gum, and when applied, produced a kind of lather and enabled the powder to pass more kindly and more simply over the teeth. However, he should be glad to hear of something better.

Mr. UNDERWOOD thought that the action of tooth powders was simply to be looked at in the same light as soap, which when used, enabled the hands to be more easily washed than with clean water. All that was wanted in a tooth powder was a sufficient degree of soapy qualifications, although he did not recommend soap powder pure and simple. The best and simplest powder he could recommend was precipitate of chalk.

Mr. ROGERS said that up to the age of thirty he had never used anything but clean water, but after that he found that it was insufficient for the removal of the whiteish matter which Mr. Coles described as clinging to the teeth. He then took to using soap simply, which for ten years answered very well, but he had afterwards found it necessary to use precipitate of chalk with the soap. Those two combined formed, he thought, a very agreeable and useful powder.

Mr. SEWELL thought that Mr. Rottenstein's paper dealt rather with the fungus which was very active, and which sometimes injured teeth and gums. That was not so much to be fought against as the acid which undoubtedly gave rise to the caries. Tooth powder that neutralized the acid would be a great preventative of caries, and therefore he thought that something more active than precipitate of chalk should be used as tooth powder, and which when in solution would pass into the cavities. It had been his practice to prescribe carbonate of soda with tooth powder, and latterly soap. He thought that saponaceous tooth powder, which was a very common article of commerce, was the best preventative of caries.

Mr. BARRETT thought it would be well to be on the outlook against a preparation which had been very much advocated, namely, the bi-tartrate of potash, which was decidedly acid, and had rather destructive effects upon the teeth, tending as it did to dissolve the phosphate of lime and to pull down the tooth structure.

Mr. MERSON recommended, as a tooth powder, precipitate of chalk mixed with a little dry carbonate of soda, which acted purely mechanically. He thought it would be an advantage if something which would act as an astringent to the gum could be obtained. He had prescribed a solution derived from the soap tree for his patients. He ordered them to immerse their brush in water containing 20 drops of the solution, and to brush their gums for five minutes, by this means a nice lather was obtained, and the feeling of cleanliness experienced after the operation was very satisfactory.

Mr. G. HENRY thought that levigated pumice stone, on account of its extreme grinding properties, was a very deleterious material to mix with dentifrices, especially in large quantities.

The PRESIDENT said that about twenty years ago he bestowed a considerable amount of attention upon the subject of dentifrices, and had ultimately decided in recommending the precipitate of chalk, in conjunction with soap,

in a dry powdery state. The value of soap was, that it rendered the mucous of the mouth quite soluble, so that it was washed away from the interstices of the teeth more effectually than by precipitate of chalk. Soap was a valuable addition to any dentifrices that might be used. The question of dentifrices was a practical one, and worthy of consideration.

Mr. MACADAM thought there was no better mode of preserving the teeth than cleaning them well by means of an effectual and repeated application of the brush. He would ask Mr. Coles if he ever used anything in the way of a disinfectant.

Mr. LESLIE said that Mr. Forbes, who had practised dentistry for about 50 years in America, had advised his patients to use a solution of prepared chalk with alcohol, which acted as an antiseptic, and he (Mr. Leslie) thought that there was nothing better to answer the purpose.

Mr. TURNER said that he had tried the "Fragrant Floriline" that had been so extensively advertised, and although at one time he had been averse to giving it a trial, he had subsequently formed a high opinion of its delicious character; after being used it left the mouth in a clean and dry state, such as was experienced after drinking a glass of dry sherry. He thought that if tooth powders were made more palatable than they were, they would be more extensively used.

Mr. F. HENRY thought that the necessity for tooth powder had arisen from the tendency in some mouths to the deposit of tartar, and that it was therefore used as a mechanical agent for the removal of that tartar. Where there was not a tendency to an accumulation of tartar, however, he had always shrank from advising the use of powders, having seen serious results from its use. He had very little faith in the use of dentifrices as a means of warding off caries, and therefore he did not care to recommend their use.

Mr. COLES said he should not attempt to give a full reply to the discussion that had been raised, but he would state, that he himself had the greatest faith in the therapeutic action of dentifrices, it was only a question as to what powder should be used. To many patients whose gums were sensitive, spongy, inflamed or tender, he had recommeded a tooth powder of chlorate of potash well ground up, which contained sufficient grit to clean the teeth and had the advantage of being soluble in the mouth, while its action on the gums was highly beneficial. In cases of prolonged neuralgia, he had ordered a tooth powder consisting of an ounce of chalk with a drachm of the sulphate of quinine, with beneficial effect to the patients. In one case a patient had been by its use entirely freed from neuralgia after having suffered from it for two or three years. On behalf of Mr. Rottenstein he thanked the members very cordially for the kind reception that had been given to the paper, the interest in which had been manifested by the number of members who had taken part in the discussion.

FROM OUR NEW YORK YORK CORRESPONDENT.

SPECIAL MEETING OF THE NEW YORK ODONTOLOGICAL SOCIETY.

THE New York Odontological Society held a meeting lately somewhat different from their usual evening meetings, and as their proceedings are to be published in book form, we are unable as yet to give more than an outline of what was done and said.

The Committee left all routine business out, and prepared a programme which was sent to their guests three or four weeks in advance. Papers and discussions on purely professional and scientific matters fully occupied every available hour of the days of meeting. The following was the programme:

MONDAY, DEC. 14.

Evening, 8 *o' Clock, No.* 8 *East* 34*th Street, Dr. Bronson's.*

Incidents in Practice.

Dr. Bonwill's Inventions—The Electro Magnetic Mallet—Rubber Disks and Dental Engine.

Dr. Jack's Electro-Magnetic Mallet.

Dr. Thompson's Head Rest.

Exhibition of other New Appliances.

TUESDAY, DEC. 15.

In the Parlors of the Presbyterian Church, (Dr. Crosby's), corner of 4*th Avenue and* 22*nd Street.*

Morning 9 *o' Clock.*—Materials for filling Teeth —Papers on Amalgams, by Dr. Cutler, the late Prof. Thos. B. Hitchcock, and Dr. Bogue, embodying the results of the Latest Investigations.

On Gold, by Dr. Black.

Afternoon.—Dr. N. W. Kingsley, on the Causes of Irregularity in the Development of the Teeth.

Evening, No. 34 *West* 28*th Street, Dr. Lord's.*

Dental Education—Papers by Dr. Garretson, Dr. Truman, and Dr. Chandler.

WEDNESDAY, DEC. 16.

In the Church Parlors. Morning, 9 *o' Clock.*

A paper by Dr. Moffatt, on Dental Eclecticism; and by Dr. Cushing, on What Patients have a right to Expect at the Hands of Dentists. Also a paper by J. Smith Turner, M.R.C.S., of London, England, on a New Method of taking Plaster Impressions.

The Committee invited guests to the number of two hundred or so, and about one hundred and twenty or one hundred and thirty responded. Thus, a selected number came together, prepared to make the most of the occasion.

The first evening was spent at Dr. W. A. Bronson's, where a number of new appliances were exhibited, including two forms of the electro-magnetic mallet, three forms of burring engine, a number of head rests, rubber disks for separating teeth, office laths, etc.

The President delivered a short welcoming address, and spoke feelingly of the death of two of the invited guests, who were expected to have been with the body—Drs. Eleazer Parmly and Asa Hill, both well known members of the profession. A committee was appointed to draft suitable resolutions, and

then Drs. Bonwill and Jack, of Philadelphia, each read a paper on the electric mallet, and gave in a condensed form (besides some quite original ideas) many facts that to obtain elsewhere would necessitate wide research. The rest of the evening was spent in promoting acquaintance among those assembled, and discussing the supper most liberally provided by the host.

Next morning the Society and guests met in the parlors of Dr. Crosby's church, and three papers were read on the subject of amalgams used for dental purposes.

The first was by Dr. Cutler, of Memphis, and detailed at length, the results of experiments that he had made on almost every metal that could be supposed to unite with mercury, to ascertain what proportions are necessary to make the best practicable alloy. The essayist did not differ materially from the conclusions that he reached in previous experiments, from which we make a few extracts.

"All good amalgams must be composed of at least two metals besides mercury."

"The metals most suitable for amalgams are reduced down to three: silver, gold and tin, mercury forming the amalgamating metal. Tin and silver make the best, silver and gold answer very well. Gold and tin (form an alloy) too brittle and hard for practical purposes; it does not harden at all when amalgamated; none of the other metals will answer, as they would not stand in the mouth."

"Undoubtedly I think amalgam may not only be used, but with most decided benefit in a great many instances; where gold cannot be used I would use amalgam for permanent use. I have used amalgam for twenty-five years quite extensively, and never in any instance have I seen a single well-marked case of disease, either local or general, from its use in my own hands, or in any others. I have seen cases that have been attributed to it use, but without satisfactory evidence. I believe that good amalgam filllings in *badly decayed teeth*, thoroughly introduced and well finished after hardening, are superior to any other filling, and will preserve such teeth much longer than gold or anything else, especially in back teeth. There are various well-founded reasons for these conclusions."

In relation to amalgam and its rank as a filling, he unhesitatingly places it next to gold for permanent use.

He has noticed great carelessness in the use of amalgams, and many good operators are quite ignorant of the proper method of using it.

The next paper was by the late Prof. T. B. Hitchcock, of Harvard Dental School, and was read by the present Dean of the School, Prof. Thos. H. Chandler, of Boston.

This paper went most carefully over the subject of the adaptability of amalgams to dental use, including the question of comparative shrinkage or change of form their permeability to colored fluid, their adaptation to the walls of the cavity, their composition, mode of working, &c. This paper gave the analysis of nine or ten of the best known amalgam fillings.

A great deal of difference was found in the different specimens as regards their adaptability to a cavity, their shrinkage and change of form. Two cases fifteen inches long, of glass tubes that were handed around, showed the pene-

tration of ink around the whole filling in some cases, only around the margins in others, and none at all in a few.

The third paper on amalgams was by Dr. E. A. Bogue, of New York relating the results of some very extensive experiments made during the past three or four months, in the chemical, physical and physiological effects of these materials as used for filling teeth, designed to answer the question frequently asked, "Are the amalgams used by dentists injurious to health?" He found that mercury was not given off from the amalgams in ordinary use. The experiments he had made were so severe as to nearly dissolve the teeth subjected to them, but in no single instance was mercury found. He had taken the solutions to Professor Chandler, of Columbia College, for analysis, and the Professor agreed with him that no mercury was discernable.

At 2.30 the meeting was again called to order, and the paper by Dr. Black, of Jacksonville, Ill., on Gold, was read. It was very interesting, eliciting discussion. In substance it is very much like Dr. B.'s essay on the same subject, published on page 283, July number of *Missouri Journal* for 1869.

After a limited discussion of this paper, which was pronounced by some, the best that had ever been written on the subject, Dr. N. W. Kingsley's paper on the "Causes of Irregularity in the Development of the Teeth" was next read, including some remarks upon the correlation of mental and dental development, or the question whether the position of the teeth and the shape of the jaws could be relied upon as a diagnostic symptom in idiocy. His opinions were based on investigations made in this country and in Europe, and the subjects were persons of all nationalities, sane and insane, and of all classes of society. The conclusions he had arrived at were that irregularities of the teeth were a symptom or a proof of a cerebral or brain disturbance which had occurred at some period of the early life of the individual, or of a like disordered mental condition at some period in the history of the patient's ancestry, and that the inevitable tendency of such a condition, if transmitted, would be mental degeneracy, imbecility, and idiocy.

In recognizing an antagonism, I cannot but be impressed with a similar contest going on more or less frequently between the mental and physical development—between the brain and the body. In the normal state of man those two systems are found working in harmony. In the present refined or degenerative state, it is fighting for supremacy, with the odds in favor of the brain. No one of extended observation will hesitate in believing that there is a faculty or power at work, modifying materially the physique of the present generation, altogether inexplicable by the too commonly asserted influencing power of climate, hygiene, or diet. Laying aside all cases that may be due to an inherited tendency to follow or exaggerate some given type, together with those which are manifestly due to forces operating only after eruption, the primary cause, so far as the individual is concerned, of any general disturbance in the development of the permanent teeth, showing itself particularly in their malposition, is directly traceable to a lesion or innervation of the trigennial nerve; that it is an interference more or less prolonged with one of the prominent functions of that nerve, and operating at its origin. If a precocious or stimulated brain in infancy urges on and crowds the dental organs in advance of the growth of the jaws, then a brain of larger calibre

or power would be likely to have associated with it a retarded dentition, but with abundance of room.

I examined the mouths of two hundred inmates of the Asylum for Idiots on Randall's Island, and I did not find a single pronounced case of a V shaped dental arch. There were very few cases of narrowed palatine arch, only three or four of saddle shaped palates, that is, of a palate approximated in the bicuspid region. There was very little irregularity in the position of the teeth, very few teeth were out of line, whatever that line was; and the malformations were generally confined to the six front teeth. There was no more irregularity, decay, loss of teeth or neglect than would be found among the same number of youths taken at random from the streets. Recently, while spending a few weeks in Switzerland, I devoted some time to the examination of the dental condition of the Cretans, and in the asylums and hospitals in Paris I examined the mouths of a large number of idiots, and the results were in no way dissimilar to what I found on Randall's Island. I visited one asylum in London, and there found a larger number of V shaped arches than I had seen in other institutions, perhaps about five per cent., but I did not see one so pronounced a case as I have treated in my private practice, the patient having a full intellectual development. The fact of seeing so much larger number of deformities when visiting the asylums in *London*, was less puzzling after I had learned the fact that nearly all the cases that I had seen were offspring of the nobility. No irregularity in the position of the dental organs is any evidence of idiocy in the individual. Irregularities of the teeth in childhood indicate more likely a precocity of mental development, and possibly a more brilliant intellect in the adult. It does prove a disturbed cerebral condition at some period of the child's history, or, if resulting from hereditary taint, shows such a condition in the progenitors, which originated from like causes, and, unless checked, will become intensified by transmission under similar surrounding conditions, and the future history of that family will be mental degeneracy.

At the evening session three papers were read on the subject of Dental Education. The first paper, Dr. Truman's, of Philadelphia, was altogether in favor of having dentistry an independent profession, without any alliance with the medical profession. The doctor was very severe on the quacks, and wanted to have a thorough test established before any candidate could become a dentist. He regretted that the standard of mental culture was so low in the profession; but instead of pursuing a selfish course, they should educate, and in time to come the lethargy of the past would be thrown aside. Dr. Garretson, of Philadelphia, addressed the meeting next, saying that dentists ought to drop their distinctive title, and consider themselves specialists in medicine.

He thought that for dentistry there should be a qualification in medicine, and that the medical diploma having been obtained, that there should be a special study made of dentistry. If the dentist was unwilling to do this, he the speaker) believed that the title of doctor ought to be dropped, and the recusant should consider himself to be a mechanic. The next speaker was Dr. Chandler, Dean of the Harvard Dental School, who thought that the field of dentistry was sufficiently large to occupy any man who chose to

engage in the work, but he believed in qualifying the student in every branch of medicine that bore directly on the special branch of dentistry. The dentist should be proficient in anatomy, special surgery, physiology, and chemistry, but beyond this he did not think that the time spent in the study of general medicine would be spent to the most advantage.

The Society resumed its session of the special meeting Wednesday morning in the parlors of the Rev. Dr. Crosby's Church, at Fourth Avenue and Twenty-Second Street. Dr. A. H. Northrop, President of the Society, occupied the chair, and Dr. Dunning spoke on the subject of Dental Education. The Secretary, Dr. Jarvie, then read a paper prepared by Dr. Cushing, on "What patients have a right to expect at the hands of dentists?" A very lively discussion, led by Dr. Atkinson, arose on this paper; all, however, agreeing upon the point that patients had the right to expect the very best treatment and the best display of talent that could be exhibited. Prof. Moffatt, of Boston, then read a paper prepared by himself, on "Dental Eclecticism." This paper excited a long discussion, in which Dr. Rich, Dr. J. S. Latimer, and Dr. Clowes, of this city; Dr. Batchelor, of Salem; Dr. Wheeler, Dr. Dunning, Dr. Sheffield, Dr. Francis, Dr. Kingsley, Dr. Butler, of Cleveland, Dr. Bogue, Dr. Atkinson, Dr. Seabury, of Providence, Dr. Searle, of Springfield, and others, took part.

Dr. Butler then introduced an appliance to be used for inserting retaining screws in the teeth. After explaining the process, one of the members asked if the appliance was for sale, and was answered that it was not, but that the explanation of the principle was given for the benefit of the Society.

The morning session was prolonged into the afternoon, for the purpose of completing the business, and at the close the Society adjourned, but agreed by resolution to meet at the residence of the late Dr. Eleaser Parmly, the oldest member of the profession, who died suddenly on Sunday last, and whose funeral the members attended in a body.

Among the many appreciative letters received since the adjournment of the Special Meeting, we have room for only the two following:

"Now that the most happy congregation which has ever been held of dentists in this country is over, may I be permitted to congratulate the Odontological Society on such a notable success? I do not forget the most remarkable papers of this Special Meeting, and I think large fruit will grow out of your late effort.

"I wish to acknowledge my appreciation of the recent glorious meeting in your city, of the most eminent men in the profession on this continent. Attendance upon that meeting was to me a rich treat. I enjoyed the session very much, and I have been greatly profited by the papers and discussions which I there heard.

DENTAL STUDENTS' SOCIETY, 40, LEICESTER SQUARE.

ANNUAL GENERAL MEETING HELD JANUARY 18TH, 1875.

E. A. LEWES, Esq., in the Chair.

MR. ROBERTS brought forward a model of the lower jaw of a patient

who was seen by him at the Dental Hospital. On examination there appeared three small swellings on the inner alveolar plate, and just beneath the lower incisors. Mr. Roberts, after making some remarks, said that Mr. Charles Tomes was of opinion that it was a case of ivory exostosis.

Mr. Felix Weiss then read the following notes:—

A young lady, aged about 17, called upon my father for the purpose of having the left upper canine regulated, it having, through the retention of the temporary canine, placed itself within the margin of the lower jaw.

A vulcanite plate was constructed, and in a few weeks the tooth pushed sufficiently forward, so that the bite might assist it into its proper place. The first bicuspid however, was a little displaced, so an elastic band was fixed upon the two teeth, namely—the canine, and first bicuspid, the patient having made an appointment for another visit in about a week. Instead of keeping her appointment however, nothing more was heard of her for over two months, when, on her way to the continent, she called, her mouth presenting the appearance shewn in the model.

You will see that both teeth are drawn very much together, a mass of gum rising to a level with the cutting edge of the bicuspid. They are pushed forward to a considerable extent, and by the necks there is a depression, shewing the entire absence of bone surrounding them. The teeth, throughout the mouth, had a slight division between them.

The first thing we did was to search for the india-rubber band, which was found almost at the apices of the teeth, and it was removed, and surrounding parts thoroughly cleaned, and a little powdered tannin rubbed in.

On my father questioning her as to the reason why she remained away so long, she replied, that she had been suddenly called away from London, and as she expected to be returning every day, would not visit another dentist, although suffering a good deal of pain.

I am sorry to say we were unable to treat the case, the patient being only in London a few hours, otherwise it would have been interesting to watch the result; but I feel convinced in my own mind that nothing but the removal of the teeth would have done any good, as three things were present—First, great inflammation; Second, loss of bone, hence the want of support for the teeth; and third, a large quantity of hypertrophied gum, all of which would have to be overcome.

Mr. E. A. Lewis said he had seen the disastrous effects which sometimes followed the use of silk ligatures, which had through some mishap slipped up the necks of teeth, and thought that great care was necessary so as not to overlook them.

Mr. W. Willis (Hon. Secretary) then read the following Report of the Council:—Another year has passed over the heads of the Dental Students' Society, and another year with its prospects opens before our view, and, in accordance with the usual custom, your Council has much pleasure in presenting its Annual Report, and in doing so they congratulate the Society upon the healthy condition it is in. Its members have materially increased, and its modest financial statement shows the balance to be on the right side. Its meetings have been fairly successful, and the casual communications have also added greatly to the interest of them. The papers which have been read before the Society are such as bear the most favorable comparison with any kindred Society. The first was one from Mr. Hart upon "Irregularities of the Teeth;" this gentleman

treated this important subject in a manner which well showed his practical acquaintance with the subject. The next was one on the Microscope, from Mr. C. White. This most useful and instructive paper, giving evidence as it did of so much thought and careful preparation, received the utmost attention of the Society. The new Session began with an exeellent paper, by Mr. E. A. Lewes, which attracted the attendance of a large meeting. It was on the subject of "Taste," a subject so fraught with interest to all. This was succeeded by a paper from Mr. Gurnell-Hammond upon "Fractures of the Jaw," being a concise treatise upon a new and ingenious method of setting such fractures, a method so simple yet so marvellously effective, that it recommended itself to all. Your Council feel certain that they are but re-echoing sentiments of the entire Society, in recording a most hearty vote of thanks to those gentlemen who have so disinterestedly and kindly imparted so much to the evening's interest. The Balance-sheet was then read, which showed that after all the expenses had been met there would still be a very creditable balance in hand.

Mr. Willis (Hon. Secretary) then said that on behalf of the Council he had to suggest some alteration in the Rules of the Society, namely, that of Rule IV., the amendment being as follows:—"That the President be chosen from the past students who had obtained their degree of L.D.S." After commenting for some time on the advantage of the amendment, he said that the Society would by this means be more complete and more what its name implied, namely, a Student's Society.

The motion was seconded by Mr. G. H. Harding, and carried *nem. con.*

The second amendment being that of Rule V., the change suggested being "That the Vice-President be chosen from a past or senior student, with or without qualification." The advantages of this alteration were clearly put forth by Mr. E. A. Lewes, who stated that the interest taken in the Society by those who were still students, must be greater than that taken by those who had long past from the student's life to one of active practice.

This was seconded by Mr. Whatford, and carried unanimously.

The following members, recommended by the Council as Officers and Councillors of the year 1875, were duly elected, and were as follows:—

President—David Hepburn, Esq., L.D.S.

Vice-President—W. Willis, Esq.

Treasurer—Felix Weiss, Esq.

Honorary Secretaries—F. J. Bennett, Esq., W. H. Woodruff, Esq.

Councillors—F. J. Bennett, Esq., F. Weiss. Esq., J. A. Gurnell-Hammond, Esq., J. Whatford, Esq., J. Palmer, Esq., W. Roberts, Esq., W. H. Woodruff, Esq., S. Birt, Esq., M. Bell, Esq.

Mr. Willis said that in the remarks he was about to make, he felt sure that he was but re-echoing the feelings of all the members of the Society. He wished to tender a vote of thanks to Mr. C. J. Fox, the Editor of the *British Journal of Dental Science*. Firstly, for his kindness in publishing the transactions of the Society; and, secondly, for his generosity in presenting every member with a report of each meeting of the Society.

This vote of thanks was heartily responded to by all.

The thanks of the Society were then recorded to the retiring Officers and Councillors.

The next meeting was then announced for 8th February, 1875, the paper being by Mr. F. J. Bennett, on "Gold Filling."

THE MEDICAL SOCIETY OF LONDON.

Monday, December 14th, 1874.

F. J. Gant, F.R.C.S., Vice-President, in the Chair.

Mr. William Rose brought forward a case of cleft palate, on which he had operated successfully. The patient, a young man, aged 23, came under his charge about three months ago. He had a fissure extending through the soft and hard palate, to within half an inch of the alveolar ridge. He spoke of the development of the upper jaw and palate, which he illustrated by diagrams, and suggested a plan of bringing the maxillæ together immediately after birth, in cases of very wide cleft. He described Sir William Fergusson's method of operating, for simultaneous closure of fissures in the hard and soft palate (a drawing of which was shown) by boring holes through the margin of the hard palate for the passage of the threads, and then cutting through it with a chisel in a line parallel to, and about half an inch from the edge of, the cleft; and also spoke of Sir William Fergusson's introduction of myotomy in the treatment of fissure in the soft palate.

Mr. Henry Smith said that he had assisted in most of Sir W. Fergusson's operations. In the early ones, operation on the soft palate alone was attempted, and the results were not so favourable as under the new plan of osteotomy. The natural covering was far superior to artificial ones; he thought Mr. Rose's case was thoroughly successful, the fissures in the hard and soft palate being completely closed.

Mr. Oakley Coles considered that the time was coming when the mechanical treatment of cleft palate would be obsolete. The great drawback in the surgical result was that the patients seldom spoke intelligibly. He remembered one instance only where speech became perfect after the operation. Failure was attributable to the fact that the free border of the soft palate in these cases never reached far enough back to touch the pharynx and act as an effective valve; and here the mechanical appliance was far more successful.

Mr. Thomas Bryant wished to know whether, in the infant, silver sutures had actually been passed through the maxillæ to bring the fissure together. There was no difficulty in piercing the hard or soft palate, but in passing the stitches through, on account of the bleeding. Mr. Bryant introduced the stitches first, which reduced an operation of half an hour to a few minutes. He had some doubt as to the dividing of the levator palati muscle in every case, but thought a division of the pillars of the fauces was an improvement.

Mr. Royes Bell stated that the speech in this case, though varying, continued to improve; the patient could sing. The hæmorrhage in these cases was much less than formerly.

Mr. Francis Mason remarked that Sir Wm. Fergusson's success was greater since he had divided the bone; previously he had used an angular knife instead of Langenbeck's raspatory, and the sloughing of the parts was due, he thought, to his taking too thin a portion off. The maxillæ had been brought together in an infant in America.

Dr. Vanderveer (America), said that, at Boston, Dr. Warren had tried Sir W. Fergusson's operation, and failed. He had also attempted it, and had succeeded in uniting the soft palate, but not the hard.

Mr. Oakley Coles said that Dr. Crombie recommended the galvanic cautery for dividing the bone, as causing less hæmorrhage.

Dr. DRYSDALE thought that obturators were very suitable for improving the voice.

After a few remarks from Mr. Acton, Mr. Mason, and the Chairman, Mr. Rose replied.—*British Medical Journal.*

CONTENTS OF OUR "EXCHANGES."

The Dental Cosmos, January, 1875.

ORIGINAL COMMUNICATIONS.—Dental Pathology and Therapeutics.—By J. Foster Flagg, D.D.S. Underlying Causes of the Decay of Teeth.—By Geo. W. Field, D.D.S.

EDITORIAL.—Torsion and Replantation. New York Odontological Society. Bibliographical.

OBITUARY.—Eleazar Parmly, M.D., D.D.S. Asa Hill, D.D.S. Tribute to Dr. T. B. Hitchcock. Death of Dr. Geo. E. Hawes.

PUBLISHER'S NOTICE.—The New Volume. Vulcanite Litigation.

Johnstons' Dental Miscellany, January, 1875.

Hyperæsthesia.—By W. S. Elliott, D.D.S. Dread of the Dentist.—By Albert H. Brockway, M.D.S. Chemical Action between Materials used for Filling and Tooth Structure.—By S. B. Palmer, M.D.S. Connecticut Valley Dental Society. New York Odontological Society. Fallibilities of Scientific Evidence in Medical Jurisprudence.—By A. C. Castle, M.D. Does the Use of Flour Promote Decay of Teeth.—By Ephraim Cutter, M.D. A Two Dollar Recipe Free—Geo. Morrison, D.D.S. Editorial. Harvard University Dental School. Notes: Irregularities—Look Out for Him—Chlorine Gas in a New Relation.

The Missouri Dental Journal, December, 1874.

Thoughts about the Arthur Method. Is the Dental Profession doing its share of Public Charity? Contour Fillings—Time. Does the Use of Flour Promote Decay of Teeth? Why Physicians, generally, make the worst of Dentists. Appeal for the Dental Pulp. The present Status of the Celluloid Question. On the Absorption of Dead Bone. Replantation of Teeth. Officers Southern Dental Association. White's Dental Engine. Celluloid. Spongoid.

The Pennsylvania Journal of Dental Science, January, 1875.

BIOGRAPHY.—Thomas William Evans, M.D., D.D.S.

DENTAL SOCIETIES.—Pennsylvania State Dental Society: Address of Welcome—Dr. C. S. Beck. Reply—Dr. C. N. Pierce. Reports from Delegates. Susquehanna Dental Association: Best Materials for Filling Teeth—Dr. C. B. Wagner. Discussion.

SELECTIONS.—Extraction of Teeth—Dr. E. A. Eaton. Dropsy of the Antrum—Dr. F. A. Fay.

NOTICES.—Report of Executive Committee. Southern Dental Association.

EDITORIALS.—Dental Education. Biography. Hickman's Improvement.

OBITUARY.—Dr. Warren C. White.

The Dental Register, January, 1875.

COMMUNICATIONS.—Anæsthetics. Introductory Lecture, Ohio Dental College, October 15th, 1874. Comments on the Recent Address of Dr. Allport, before the Academy of Dental Science, Boston, Mass. Mechanical Appliances in Operative Dentistry. Correspondence.

PROCEEDINGS OF SOCIETIES.—Ohio State Dental Society, Columbus, December 2nd, 1874. Southern Dental Association.

EDITORIAL.—Twenty-ninth Volume. Obituary.

Le Progrès Dentaire, Janvier, 1875.

De l'emploi de l'électricité comme anesthésique local, par la rédaction. Formules diverses. Lettre de MM. Rosenthal. Soins de la bouche antérieurs à l'obturation des dents, par M. James E. Garretson. Du cure-dent et de ses inconvénients, par le Dr. Andrieu. Moyen simple de remplacer la digue de caoutchouc, par M. Th. Fletcher. Société odontochirurgicale (discussion sur les amalgames, etc.) De l'usage du gaz dans le laboratoire, par M. Fletcher. Avis divers. Réponses aux correspondants, journaux et ouvrages reçus, etc.

Correspondenz-Blatt, für Zahnärzte, October, 1874.

Ueber den Zustand des Mundes und der Zähne während der Schwangerschaft —Oakley Coles. Ueber die sogenannte Bloennorhoe der Zahnfächer—B. Heuckeroth. Besprechung physiologischer Zustände bei Entstehung der Zahncaries—Verhütung derselben durch das Kalthalten der Mundhöhle—B. Heuckeroth Ueber die Wirkung von heissen und kalten Flüssigkeiten auf die Zähne—*Dental Cosmos*. Engle's Patent für die Befestigung von Porzellanzähnen an Goldoder Silberplatten—Charles J. Essig. Ueber Amalgam—Dr. E. A. Bogue. Dentinal Desiccator—George Owen. Eine verbesserte Lampe zum Ausglühen von Goldfolie—G. Owen. Eine verbesserte zahnärztliche Spritze—G. Owen. Zusammenschweissen von Metallen auf kaltem Wege—T. Fletcher. Kleine Instrumente zu härten—*Chemist and Druggist*. Vermischtes. Programm der ersten Wiener zahntechnischen Schule.

DOES THE USE OF FLOUR PROMOTE DECAY OF TEETH?

BY EPHRAIM CUTTER, M.D.

THERE is no doubt that the decay of teeth prevails to an alarming extent, and it is very humiliating to our modern civilisation to have it characterized so generally, by the occurrence of diseased teeth. The ætiology of this disease is a great, broad, and deep subject. No doubt many elements combine together to cause it; and the person who should positively announce a single agent would be dismissed as unworthy of attention. Still it is a matter worth discussing, and deserving the attention of the ablest minds. To ignore is not to arrest; hence we offer a few suggestions for consideration.

"The *Chemical News* ascribes the potato rot to a deficiency of lime and magnesia in the soil. Different observers state the per centage of magnesia in the ash of sound tubers at from five to ten per cent.; in the diseased tubers an analysis shows only 3.94 per cent. Analysis of sound tubers shows over five per cent. of lime, but in the ash of diseased tubers only 1.77 per cent. was found. A similar observation was made some years ago by Professor Thorpe, with regard to diseased and healthy orange-trees; in the former there was a deficiency of lime and magnesia."

According to these authorities, a deficiency of mineral salts in the vegetation named is supposed to be a sufficient cause for decay. Now it is an interesting question whether there is any article of food employed by mankind which is deficient in mineral matter. If so, then it should be made known to every family in the land.

Perhaps there is no article of food more generally consumed than flour, *i. e.*, wheat flour. In the forms of bread, cakes, and pastry of all kinds, it enters into every house, and is universally used and regarded as the "staff of life."

Does flour possess a requisite amount of mineral matter?

To answer this question, Mr. Sharples, the well-known chemist, analyzed for me the "Peerless Flour." He found 0.55 per cent. of mineral ash, a little over half of one per cent. He stated also that the proportion of ash in the whole grain varied from 1.65 to 2.50 per cent. So that diminution of mineral food varies from two thirds to four fifths. In other words, *by the use of flour, mankind loses from two thirds to four fifths of the elements that go to make up teeth and bony structures.* This statement deserves to be written in letters of gold over the door of every bakery and kitchen in the land.

Flour has been used for generations, and if we can rely upon Mr. Sharples' statement, mankind has all this while been deprived of the greater moiety of the mineral food that the Almighty intended it should have the benefit of. Is it not natural to expect that the bony structures should suffer from this great withdrawal? For it is a great withdrawal. Suppose that a water supply pipe should be cut off two-thirds to four-fifths, would not the supply be greatly diminished? Cut off the same quantity of time from the hours of daylight; would not our darkness be great? Take away two-thirds to four-fifths of our muscular food; would not a strong man become very weak? Cut off air to the same extent; would we not lose our breath? And why should the bony tissues not suffer in like manner when their food is withdrawn? I think they do. Perhaps a little evidence in the contrary direction may throw light upon this.

A dentist, whose name is well known, said that he filled some fourteen cavities in the teeth of his first-born child by the time he was four years of age. He put his family upon the use of the whole grains, and the next child had no retarded dentition, and not a decayed tooth up to the same age!

The same gentleman says that the teeth which decay are not compacted or knit together with the firmness of healthy teeth. There seems to be an arrest of perfect development. Though what can be more natural than to expect imperfect development and decay, when from two-thirds to four-fifths of the proper bone food is habitually withdrawn from an article of diet which is more largely used than any other?

How common it is to see infants not cutting any teeth at all, until they are twice as old as they ought to be. The good effect of the whole grain diet is shown in Dr. Harriman's second child, above alluded to. To be sure, it is only *one* case, and must not be made too much of.

Now what is to be done about it? Certainly one man's dicta amount to but very little alone. What we need is evidence from others. Suppose that every medical association of Massachusetts take up this matter, have analyses of flour made, try feeding mothers and children upon the whole grains of wheat-meal, oat-meal, corn-meal, beans, etc., and suppose they all come to the same conclusion as the writer has done. Suppose they officially announce the result. Would it be long before the general public would heed the truth,

and thousands of persons would rejoice in the possession of that priceless treasure, a set of perfect teeth?

Note.—Through the kindness of Mr. E. H. Davis, Superintendent of Public Schools in Woburn, Mass., the writer has been furnished with the following *astounding* statistics, embracing returns from several of the largest primary schools of Woburn, a fair representation of the prevalence of diseased teeth among children :—

	No. Scholars.	Teeth. With Sound	Decayed.
Lawrence Primary	113 —	13 —	100
Plympton St. Primary	94 —	27 —	67
Highland St. Primary	71 —	25 —	46

The following Publications have been Received:—

The Dental Register.
Johnston's Dental Miscellany.
Le Progrès Dentaire.
Le Progrès Médicale.
The Dental Cosmos.
The Pennsylvania Journal of Dental Science.
The Missouri Dental Journal.
Deutsche Vierteljahrsschrift.
Transactions of the Odontological Society.
Correspondenz Blatt.
Boston Journal of Chemistry.
The Dental Advertiser.
The London Medical Record.

LONDON DENTAL HOSPITAL.

CASES TREATED FROM JANUARY 1ST TO JANUARY 31ST, 1875.

Extractions. Children under 14	261
Adults	397
Under Nitrous Oxide	148
Gold Stoppings	90
White Foil ditto	56
Plastic ditto	132
Irregularities of the Teeth treated surgically and mechanically	50
Miscellaneous Cases	209
Advice Cases	51
Total	1394

DAVID HEPBURN, *House Surgeon.*

CORRECTION.—In our last issue the name of Mr. Hollis was inserted instead of that of Mr. Wallis, as having obtained the diploma of Dental Surgery of the Royal College of Surgeons.

TO CORRESPONDENTS.

ALL communications intended for the Editor should be addressed to the care of Messrs. SMITH, ELDER & Co., 15, Waterloo Place, Pall Mall.

All inquiries respecting Advertisements and Subscriptions should be sent to Mr. GEORGE BUTCHER, 4, Crane Court, Fleet Street, E.C.

THE MONTHLY REVIEW
OF
DENTAL SURGERY.

No. X. MARCH, 1875. Vol. III.

A BRITISH DENTAL ASSOCIATION.

The position that has been attained by the dental profession as the result of association and friendly intercourse, points clearly to the fact that it is desirable that a more extended endeavour should be made to bring the large and constantly increasing number of members of the profession in the United Kingdom into still more frequent and intimate relation with each other. The Odontological Society has, for the last fifteen years, most earnestly striven to promote the unity of the profession, but owing to its meetings being held exclusively in London, it is obvious that there must be a limit to its capabilities in this direction. It has done so much, however, that it is now manifest, that an association on a broader basis may achieve a still larger measure of success. It would be clearly inconsistent with the maintenance of its present influential position, for the Odontological Society to affiliate itself with small local societies in various parts of the kingdom; this work must be left to another and distinct organization. Such an organization we would now propose to our readers and the profession in general, under the name of "The British Dental Association." Those who are

aware of the character and constitution of "The British Medical Association," will most readily understand the advantages and capabilities of the scheme we thus bring forward. The general council would be in London, made up both of provincial and London practitioners; branches would be established in various centres throughout the kingdom, having an organization of their own for all local purposes.

An Annual Session, lasting three or four days, would be held once a year, and it would add much to the success of these meetings if they took place at the same time and in the same town as the Session of the British Medical Association. Advantage might then be taken of the increased facilities given by the railway companies and local institutions for holding a pleasant gathering, whilst it would afford a better opportunity to those gentlemen who are already members of the Medical Association, of attending the meeting of their own special department of surgery. The President would be elected from the town in which the British Dental Association met, so that honour might be done to those gentlemen in the provinces who have so long and so worthily upheld the claims and dignity of our profession. At the Annual Session one day at least might be set apart for clinical demonstration, so that a free interchange of ideas might stimulate original work and encourage the publication of new methods of treatment of oral disease.

The present time seems a peculiarly suitable one for founding The British Dental Association. We might meet in August for our first Session at Edinburgh, a city that above all others, is associated most intimately with the science and progress of Dental Surgery, and where we should be well assured of the most open-hearted hospitality.

Having thus sketched out the object and scope of the proposed new association of the Dental Surgeons of the British Kingdom, we must leave it to the profession to decide whether it shall become an accomplished fact ere the end of the summer, or remain in the limbo of unfulfilled desires.

NOTE.—In the absence of any other present means of eliciting the feelings of the profession on this subject, we shall be glad to receive communications from all those gentlemen interested in the matter, addressed to "the Editor of the Dental Review," 15, Waterloo Place, Pall Mall, S.W.

We might then establish a provisional committee which would be in a position to canvass the entire profession.

THE MONTH.

THE LONDON DENTAL HOSPITAL.

THE Annual Meeting of the Governors of the London Dental Hospital took place on the 11th inst., the Hon. Arthur Kinnaird in the chair. The Hospital is making satisfactory progress, and it requires only a more liberal public support to become a still greater boon to the poor of London.

THE COMMEMORATION DINNER.

A pleasant evening was spent by the London and Provincial members of the profession who take an interest in the London Dental Hospital, on the occasion of the Commemoration Dinner, held at "The Criterion" on Thursday, the 11th inst. About one hundred and thirty gentlemen were present, amongst the visitors being Mr. Le Gros Clark, Mr. Savory, and Mr. Hyde Hills. The chair was taken by Mr. Campbell De Morgan, F.R.S.

THE CONTENTS OF THE "REVIEW."

In consequence of the pressure on our space this month, caused by the fulness of the report we have given of the discussion following Dr. Woodman's paper, we have been compelled to introduce a larger quantity of small type than usual, and to hold over a number of communications.

ON A CARIOUS TOOTH.

By W. J. BARKAS, M.R.C.S.E., L.R.C.P. Lond.

Part I.

STRUCTURE OF THE HEALTHY TISSUES.

(*Continued from page* 358.)

DENTINE *(continued)*.

I. Does a dentinal tubule contain a fibril or fluid during life?

This is the first point to be settled before any correct idea can be obtained of this structure when in health, of the changes that it undergoes when it is attacked by caries, or of the mode in which the spread of decay is prevented in certain cases. With all due deference to Mr. Tomes, I consider that the microscopical appearances are decidedly against his statements, however much his theory may fall in with the physiological phenomena. I grant that almost all the microscopical facts he adduces are correct, I only dispute his deductions from them. There can be no doubt, also, that the theory of a fibril penetrating to the extremity of a dentinal tubule, would account for the phenomena he alludes to in an exceedingly satisfactory manner, but that is not a sufficient reason for forcing the facts, by hook or by crook, to agree with the theory. It is now some years since Mr. Tomes gave forth his fibril hypothesis, but so far as my knowledge extends, no other microscopist has supported him, at least not in books, in fact, Professor Owen, undoubtedly our greatest odontologist, in his "Comparative Anatomy and Physiology of Vertebrates," published in 1866, completely ignores the fibril theory, and retains his original statement that the tubes are hollow, and contained plasma during life; Mr. Salter in his new work, entitled, "Dental Pathology and Surgery," also distinctly repudiates it; the reviewer of the last edition of Mr. Tomes' work, "Dental Surgery," who wrote in the *Monthly Review of Dental Surgery* for August, 1873, is equally opposed to the theory. Nor are these the only opponents that Mr. Tomes has to contend against, for we have such great comparative anatomists as Leeuwenhoek, Purkinjé, Müller, Retzius, Schwann, Lent, Kolliker, Henle, Huxley, &c., &c., all arriving at the conclusion, from their individual researches, that the dentinal tubules are only filled with fluid during

Fig VII.



Fig VIII.

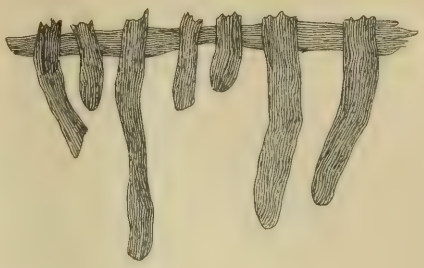
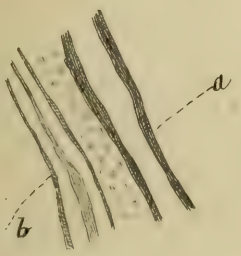


Fig IX.



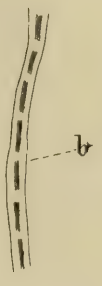


Fig X.

Fig XI.

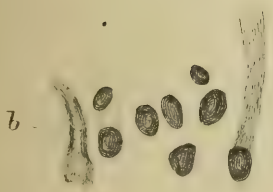


Fig XII.

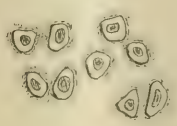
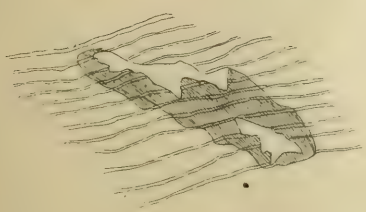


Fig XIII.



Fig XIV.



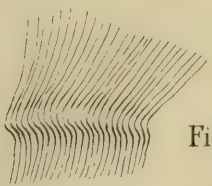


Fig XV.

T. Bessent lith. 29 Essex St. Strand

life. Their conclusions were, of course, derived from the microscopical and optical appearances presented by the tubules when examined in longitudinal and transverse sections, and under various modes of treatment, and also from the fact that when a coloured liquid is applied to the open mouths of these tubules, it runs up, undoubtedly by capillary attraction. The majority of these facts are not denied by Mr. Tomes, but he disputes the deductions drawn from them; against these deductions he brings a number of suppositions. First, he lays great stress upon certain physiological phenomena, but I have already disposed of them. Second, he advances the hypothesis that the reason why a coloured fluid passes up a tube when applied to its open mouth, is because the internal fibril has become dried up, thus leaving a space between it and the tube-wall for the fluid to be drawn into; but unless the presence of a fibril is first distinctly shewn, this hypothesis is far-fetched indeed, because the coloured liquid will run up the tubules of a tooth that has been freshly extracted, and in which, therefore, the fibril, if there were one, could not have had time to shrivel up; again, if Mr. Tomes were right, we ought to see that dried up fibril in a transverse section, which I certainly never have done, though I have looked for it with a sixteenth of an inch immersion lens combined with the C eye-piece:* third, and now we arrive at his first attempts at proof, he brings forward, as though they were something new, the old experiments mentioned years before by Müller, Henle, &c., of fracturing a *freshly-drawn* tooth transversely to the direction of the tubules; and of adding acid to a tooth until the calcareous salts are dissolved out, then tearing it at right angles to the course of the tubes. In the first case there are some rigid projections extending for a very short distance from the fractured surface, and in the second there are flexible projections extending to a much greater distance; these projections are considered by Mr. Tomes to be the fibrils, all other microscopists believe them to be the tubules; Mr. Tomes' only reasons for believing them to be fibrils are—that if they were fibrils the physiological phenomena could easily be accounted for, that there are processes extending from the pulp into the mouths of the tubules, and that these

* A. Kellner.

supposed fibrils have a diameter exactly equal to the diameter of the internal cylinder of the tube. We may put to one side the inference drawn from the processes entering into the orifices of the tubes that are patent at the periphery of the pulp cavity, because no other comparative anatomist agrees with Mr. Tomes that these processes are fibrils, though they almost all agree that these prolongations are present, but they dispute that they are anything more than prolongations of the external cells of the pulp, extending for a short distance only into the tubes. Mr. Salter, however, differs from both the above views, for he denies the presence of any prolongations at all *into* the tubes, but considers that these processes are continuations of the parietes of the tubes themselves. Of course, if Mr. Salter's statement be correct, Mr. Tomes must give up this ground of support for his theory; I shall refer to this portion of the subject again under query VII. The deduction from the physiological phenomena I have already alluded to. The only point, and the point upon which Mr. Tomes lays the greatest stress, that we have now to dispute, is his inference that the tubes projecting from the fractured edges in the two experiments I have described above, are the "easily demonstrated fibrils," and not tubes. The experiments Mr. Tomes depends upon for his idea had all been made, by the distinguished microscopists I have named, years before his work appeared, but they saw nothing to cause them to consider these projections as other than the tubules themselves; if, however, Mr. Tomes' statement were true that these projecting fibres had a diameter equal to the internal cavity of the tubes into which they entered, then there would be strong evidence in his favour, but it is now well known to all microscopic odontologists that his supposed tube-wall beyond the sheath of the fibril, and which he apparently believes to be visible only in imperfect or carious dentine, is due to an optical illusion; I shall return to this when speaking of the microscopical appearances of healthy dentine. There are many things that have occurred to me that militate against the fibril theory as deduced from these experiments. First, when dentine has been decalcified and then torn across, the projecting tubes will be seen to proceed into the intertubular tissue without any diminution of diameter, this ought not to be the case if they were the delicate soft tubular fibres Mr.

Tomes thinks it likely they are, for it is only reasonable to suppose that such a fibre filled with fluid matter would flatten out directly it lost the support of the tube-wall. Second, when they enter into the tissue they are not surrounded by tube-walls, unless the intertubular tissue can be considered as such, neither in a healthy tooth nor in one affected by caries. Third, if a tube, in a tooth not acted upon by acid, contained a fibril, it ought to happen that when the fibril became dry and shrivelled up, it should possess more tenacity than when fresh, soft, and easily lacerated, and, therefore, it ought to project better when a dry tooth is fractured than it does when a fresh tooth is similarly treated, unless Mr. Tomes further supposes that in the act of drying, the fibre completely disappears, or becomes glued to the tube-wall. Fourth, these supposed fibrils, according to Mr. Tomes, cannot be seen with any distinctness, except the calcareous matter has been dissolved out of a fresh tooth, then if the tooth be torn, they project greatly and are soft; if the dentine is fractured without being acted upon by acid, the supposed fibrils are exceedingly slightly projected and very rigid; this rigidity ought not to be the case if the fibrils were distinct from the parietes of the tubes, though they might be shorter in their projection, because Mr. Tomes himself states that they are soft and pliable, besides, I see no reason why there should be so slight a projection in the latter case, unless the fibrils were united to the tube-walls, but if this were the case, how could we account for the great length in the first experiment? the acid would not destroy the tube-walls to which the fibrils were attached, but would only dissolve out the earthy matter, the fibril, therefore, would still remain fastened to the animal matter, and would have a projection very little longer than in the latter experiment. Fifth, Mr. Tomes expressly states that these fibres are only to be seen in decalcified, *freshly-extracted* teeth, and it is very evident that this must be so if his description of a fibril be taken as correct, it is equally evident that if these so-called "easily demonstrated fibrils" can be observed in teeth that are quite dry, the above statements are incorrect, and that these "easily demonstrated fibrils" are not fibrils at all, but true dentinal tubes. Mr. Salter has succeeded in shewing these projections in a tooth of an ancient Briton, and he says that they are similar to those from a freshly-

extracted tooth. I certainly cannot reproduce Mr. Salter's experiment so satisfactorily as he has done, but in Fig. VIII. I illustrate some tubules, from an old tooth, that project for a little distance; it will be noticed that these tubules are not shrivelled in the slightest. Sixth, in a transverse section of a tube, whether taken from a fresh tooth, a fresh tooth acted upon by acid, an old dry tooth, or a carious tooth, there cannot be discovered any sign of an internal fibre. In my opinion, therefore, all the deductions that can be legitimately drawn from the projections in these experiments, go to prove that they are not fibrils, but the dentinal tubes themselves. It is easy to understand how the tubes would differ in their length under these two methods of treatment; in the one case where not any acid was applied, the parietes of the tubes would be necessarily rigid, but not so brittle as the intertubular tissue, the former being a calcified organized structure, the latter, a calcified homogeneous blastema, the tubes would, therefore, project slightly, but very slightly, beyond the fractured surface; but in the second case, if acid were applied to dissolve out the calcareous matter, it is probable that the acid would act upon the earthy matter of the tube-walls to a greater extent than upon the intertubular tissue, and after a time would leave parietes of purely animal substance while the surrounding tissue would remain, from its want of porosity, somewhat rigid; if such were the *modus operandi*, the dentine, when torn across, would of course have its soft flexible tubes drawn out, and which would stretch to a greater or lesser extent, and, if broken, they would give out whatever fluid remained in their interior. This method of accounting for the action of the acid, appears somewhat different from that of Mr. Salter, but it must be remembered that my supposition applies to the action of the acid upon somewhat thick sections of dentine, cut parallel to the tubes, there can be no doubt that the mode detailed by Mr. Salter, solves the question as to how acid acts upon a transverse section.

II. What are the microscopical appearances presented by the tubules of a healthy tooth?

On examining a thin section of dentine, cut parallel with the course of the tubes, from a freshly extracted tooth with a high magnifying power, it will be noticed that the tubules present a variety of aspects; some are quite

transparent, and others are quite black, but the majority present both these appearances in some part of their course; in a few cases they are granular, but this is more generally a sign of commencing caries, or of abnormal dentine, so we may pass over this variety for the time being. A further examination of the transparent and dark tubes brings some other peculiarities into notice, that are very apt to mislead microscopists as to their true structure. On looking at a transparent tubule under a high power, and by transmitted light, it exhibits an appearance, when in exact focus, of a clear central column with fine black borders (Fig. IX*a*), beyond which is the intertubular tissue, but give a very minute turn to the fine adjustment, in order to carry the object glass away from the object, but not so far as to destroy the definition of the tubule, and the tube will appear to possess a dark central column, surrounded by a clear space, beyond which are the lateral dark borders, very faint, and the intertubular tissue (Fig. IX*b*). This is the appearance that Professor Owen has figured in his "Odontography," as the true aspect of a dentinal tubule, but there cannot be the slightest doubt that in this case he has examined a tube slightly out of focus. A further turn of the fine adjustment in the same direction, causes the tube to become dark throughout (Fig. XIII), and this is the chief reason why many of the tubules in a vertical section of dentine appear black, they are slightly out of focus; depress the object glass, and they will become transparent, if they have not been infiltrated with a dark fluid. The alternate black and white appearance in some of the tubes (Fig. X), may be due to the alterations of focus that the tube must necessarily present, from the frequency of its gyrations, and from its primary curves. All these characters are even more marked in a dry tooth. What can we ascertain as to the nature of the tube from these appearances? The first point that they shew is that whatever the contents of the tubules may be, they possess a lower refractive power than the intertubular tissue; but we cannot judge from that evidence what the contents are, unless we know, somewhat approximately, the degree of refrangibility of Mr. Tomes' supposed fibril, and that of fluid plasma. It is probable that a fibril would possess a higher degree of refractive power than plasma; if such were the case, then

the tubules would remain almost transparent, while the object glass was being raised, until they became quite out of focus, when, of course, they would be indistinct; fluid plasma, it is well known, would produce all the appearances I have detailed. We must, therefore, now try to settle the question as to what amount of refrangibility Mr. Tomes' supposed fibril possesses. He asserts that the fibrils have a "comparatively low refractive power," from which I infer he means that they are lower in this respect than the intertubular tissue. If my inference be correct, Mr. Tomes' next statement is completely opposed to it, he says that the fibrils are almost invisible in glycerine or Canada balsam. Now glycerine and Canada balsam have nearly, if not quite, the same refractive powers as dentine, as can be very easily shewn if a very thin section of that tissue be mounted slowly in these substances in order to enable them to permeate the tubes; the section appears to lose its tubular appearance. Therefore, if Mr. Tomes' latter statement be true, and I readily grant that it is, it is evident that his supposed fibril has the same refractive power as the intertubular tissue, and the parietes of the dentinal tubules, and in that case the tubules in a vertical section from a fresh tooth, could not present the different appearances that I have described as occurring on minutely altering the focus, they would remain clear until they became indistinct, and the whole structure would appear almost tubuleless, just as it did when the tubes were filled with balsam or glycerine. This action of Canada balsam and glycerine upon the supposed fibrils of Mr. Tomes, of itself demolishes the fibril theory; it shews that the projecting tubes are true dentinal tubules. There is one other point that tends to shew that the tubules were filled with fluid; air is invariably present in them to a greater or lesser extent, it matters not whether the section be taken from a fresh or an old tooth; this we learn from the rapidity and marked character of the changes of appearance that the tubules undergo when the focus is altered, on account of the air having a much lower degree of refrangibility than fluid plasma, and lower still than dentine. It is, therefore, very clear that if the black spaces in those tubules from a fresh tooth, that present an alternate black and white appearance, as in Fig. X., be due to the presence of air, that the contents of those tubules cannot

be fibrils but must be fluid; it will frequently be observed too, that a great number of tubules in a section are filled with air throughout the first half of their course, while the peripheral half remains occupied with its natural contents. Both of these appearances could be explained without difficulty if the contents were fluid, in the first case, the air could pass through the fluid, and in the second the fluid might run out when the connection between the tubule and the pulp was severed.

A transverse section of dentine, cut extremely thin, when examined under a very high power, is observed to be riddled by numerous openings, each orifice being surrounded by a tube-wall of considerable thickness, and beyond that by intertubular tissue (Fig. XI), this appearance is rendered more marked by the addition of strong hydrochloric acid, which dissolves away the intertubular tissue surrounding the tubes, more rapidly than it acts upon the parietes of the tubules, thus causing the cut end of the tubes to stand out from the intermediate tissue; besides, it extracts the earthy matter from the animal tissues, and so alters their refractive powers, at least it is probable the animal matter of the tube-walls will differ in this respect from the basis of the intertubular tissue, because the former is a true growth, while the latter is considered to be an excreted blastema. Professor Owen states exactly the contrary to the above, he asserts that the addition of acid causes the parietes of the tubes to become indistinct, and gives as his reason that the extraction of the calcareous matters assimilates the refractive powers of the tube-walls and the intertubular tissue. The Professor is most decidedly wrong, as is clearly shewn in Fig. XII. Such are the appearances that I have observed in transverse sections of dentine, and it will be seen that they agree completely with Professor Owen's statement that the tubules have comparatively thick parietes; Mr. Salter denies that the tube-walls are thick, and believes that they appear so from the irradiation or diffraction of the light by the thin cut edges of the tubules, but he honestly says that he cannot prove that such is the case; I quite agree with Mr. Salter, that if his illustration, Fig. I. correctly exhibits what he has seen, that the tube-walls in that example are too thick, but it strikes me that he has been employing a solid beam of bright yellow light, trans-

mitted obliquely; however that may be, I find that the walls of the transversely cut tubules, both before and after treatment by acid, have a similar diameter, averaging one thirty-thousandth of an inch, the internal cavity therefore possesses a diameter equal to one-third of the diameter of the whole tube. The walls of the tubes in Fig. XII cannot be an optical illusion, because I have examined them with a sixteenth of an inch immersion lens, combined with the C eye-piece, and by hollow and solid beams of light, and they agree with the appearances presented by the eighth and fifth object glasses employed under the same conditions. In Figs. XI. and XIII., it will be noticed that the transversely cut fibres present nearly the same diameter as those portions of the fibres that are shewn in profile, but are seen somewhat indistinctly from being out of focus; what difference there may be between them is sufficiently accounted for by the difference of focus, but in any case there is not such an exaggerated difference as Mr. Salter's illustration would lead one to infer.

EXPLANATION OF PLATE.

Fig. VII.—Portions of dentinal tubules shewing secondary cu rves Magnified 250 diams.

Fig. VIII.—Dentine fractured transversely, and shewing the projecting tubes stained black. Magnified 1300 diams.

Fig. IX.—Dentinal tubules. *a* When in true focus. *b* Slightly out of focus. Magnified 1300 diams.

Fig. X.—Dentinal tubule, shewing alternate black and white spaces. Magnified 500 diams.

Fig. XI.—Dentinal tubules. Transverse section. Magnified 1300 diams.

Fig. XII.—Dentinal tubules. Transverse section, treated with acid. Magnified 1300 diams.

Fig. XIII.—Dentinal tubules. Oblique section. Magnified 1300 diams.

PROCEEDINGS OF THE ROYAL SOCIETY, 1875.

ON THE STRUCTURE AND DEVELOPMENT OF THE TEETH OF OPHIDIA.

By CHARLES T. TOMES, M.A.

(Abstract.)

CONTRARY to the opinion expressed by Professor Owen and endorsed by Giebel and all subsequent writers, the author finds that there is no cementum upon the teeth of snakes, the tissue which has been so named proving, both from a study of its physical characters and, yet more conclusively, from its development, to be enamel. The generalization that the teeth of all reptiles consist of dentine and cement, to which is occasionally added enamel, must hence be abandoned.

Without as yet pledging himself to the following opinion, the author believes that in the class of reptiles the presence of cementum will be found associated with the implantation of the teeth in more or less complete sockets, as in the crocodile and ichthyosaurs.

The tooth-germs of Ophidia consist of a conical dentine-germ, resembling in all save its shape that of other animals, of an enamel-organ, and of a feebly expressed capsule, derived mainly from the condensation of the surrounding connective tissue.

The enamel-organ consists only of a layer of enamel-cells, forming a very regular columnar epithelium, and of a few compressed cells external to this, hardly amounting to a distinct layer; the enamel-organ is coextensive with the dentine-germ. There is no stellate reticulum separating the outer and inner epithelia of the enamel-organ.

The successional teeth are very numerous, no less than seven being often seen in a single section; and their arrangement is peculiar, and quite characteristic of the Ophidia.

The tooth next in order of succession is to be found at the inner side of the base of the tooth in place, where it lies nearly horizontally; but the others stand more nearly vertically, parallel with the jaw and with the tooth in place, the youngest of the series being at the bottom.

The whole row of tooth-sacs is contained within a single general connective-tissue investment, which is entered at

the top by the descending process of oral epithelium, whence the enamel-germs are derived.

As they attain considerable length, the forming teeth, which were at first vertical, become nearly horizontal, resuming, of course, their upright position once more when they come into place.

The clue to the whole peculiarity of this arrangement is to be found in the extreme dilatation which the mouth of the snake undergoes. The general capsular investment probably serves to preserve the tooth-sacs from displacement; while, if the forming teeth remained vertical after they had attained to any considerable length, their points would be protruded through the mucous membrane when this was put upon the strctch in the swallowing of prey.

Just as the author has shown in a previous communication to be the case in the Batrachia and Sauria, the hypothetical "papillary stage" is at no time present.

From the oral epithelium there extends downwards a process which, passing between and winding around the older tooth-sacs, after pursuing a tortuous course, reaches the furthest and lowest extremity of the area of tooth-development. Here its cæcal end gives origin to an enamel-organ, and, while it does so, buds forth again beyond it in the form of a cæcal extremity. Thus at the bottom of this area of tooth-development there is a perpetual formation of fresh enamel-organs, beneath which arise corresponding dentine-organs, or papillæ, if such they can be called when arising thus far away from the surface.

In essential principle, therefore, the formation of a tooth-germ is similar to that already described in mammals and other reptiles, the difference lying principally in the enormous relative length of, and the tortuous course pursued by, that inflection of the oral epithelium which serves to form the enamel organs. The attachment of the tooth to the jaw is effected by the rapid development of a coarse bone, which is not derived from the ossification of the feebly expressed tooth-capsule, but from tissues altogether external to it. Nevertheless this coarse bone of attachment adheres more closely to the tooth than to the rest of the jaw, from which, in making sections, it often breaks away.

The base of the dentinal pulp assists in firmly binding

the tooth to this new bone, being converted into a layer of irregular dentine.

This "bone of attachment" is almost wholly removed and renewed with the change of each tooth.

ON THE DEVELOPMENT OF THE TEETH OF THE NEWT, THE FROG, AND CERTAIN LIZARDS.

By CHARLES S. TOMES, M.A.

(Abstract.)

That the "papillary stage" of tooth-development could not be said to at any time exist either in the frog or in certain fish, was pointed out nearly twenty years ago by Professor Huxley, who, however, accepted, on the authority of Goodsir, the latter's theory of the process as true of Man and Mammalia. In more recent years Kölliker and Waldeyer have traced out the course of the development of teeth with great accuracy in Man and some other Mammalia, with the result of showing that the usually accepted veiws propounded by Goodsir and Arnold are not by any means an accurate representation of what takes place in them.

Since the date of the publication of Professor Huxley's paper, I am not aware that any thing has been published bearing upon the development of the teeth of Reptilia and Batrachia, save a paper by Dr. Lionel Beale upon the development of the teeth of the Newt, and a short and inconclusive paper by Santi Sirena; with the exception of the papers alluded to, the subject may be taken to stand in the position which it occupied at the time of publication of Professor Owen's 'Odontography,' in which we are told that the teeth-germs of Reptiles and Batrachia never stop at the papillary stage, but that the primitive dental papilla sinks into the substance of the gum and becomes inclosed by a capsule.

The principal facts which my observation enable me to state are:-

That there is no such thing as a "dental groove" or "dental fissure" in the Batrachia and Sauria, but that the whole process takes place beneath an unbroken surface of epithelium.

That there is no such thing as a stage of "free papillæ,"

and consequently no sinking of papillæ into the gum and subsequent encapsulation of the same.

Instead of being formed in a "dental groove" the teeth are developed in a region which may be termed the area of tooth-development, varying in form and extent in different Reptilia, but agreeing in all in possessing the following characters:-

It is bounded on the one side by the teeth in place and the parapet of bone which carries them, and on the other, or inner, side by an exceedingly sharply defined boundary, consisting of dense connective tissue. At the surface, near where the functional tooth projects above the oral epithelium, it is narrow, but it expands as it passes more deeply below the surface. Within this area are developing tooth-sacs of different ages, the interspaces being occupied with a loose areolar tissue, differing in appearance from that which is seen outside the area, and appearing to be derived from portions of older tooth-sacs, which have not been entirely used up in the formation of the teeth.

The individual tooth-sacs are formed thus: an inflection of the cells of the oral epithelium, in section like tubular gland, passes down along the inner side of the area above defined, until it reaches nearly to the level of the floor of the area. The depth to which it penetrates is considerable in many forms, *e. g.* in the Lizards, in which, therefore, this double layer of epithelial cells appears a mere line.

At the bottom of this inflection of epithelial cells the adjacent tissue assumes the form of a small eminence (without at first any visible structural alteration), while the epithelial process takes the shape of a bell-like cap over the eminence.

This epithelial inflection then goes to form the enamel-organ; the eminence becomes the dentine-organ.

Thus the enamel-germ is the first thing recognizable, and the presence of this ingrowth of epithelial cells seems to determine the formation of a dentine-organ at that particular spot which lies beneath its termination.

The enamel-organs, after they are fully formed, retain a connexion with epithelial cells, external to the void or spherical tooth-sacs, at their summits; and the enamel-organs of successive teeth appear to be derived from the necks of those of their predecessors rather than from fresh inflections from the surface of the oral epithelium, though I am not sure that this is, in all instances, the case.

The tooth-sac of the newt is entirely cellular, and has no special investment or capsule; under pressure it breaks up and nothing but cells remain, as was noted by Dr. Lionel Beale.

That of the frog has an investment, derived in the main from what may be called the accidental condensation of the surrounding connective tissue, which is pushed out of the way as it grows; while in the lizard the base of the dentine-germ furnishes lateral prolongations, just as has been observed to be the case in man.

The dentine-organs conform closely with those of mammals; the odontoblast layer is very distinct, and the processes passing from these cells into the dentine-tubes are often visible.

The enamel-organs consist only of the outer and inner epithelia, without any stellate intermediate tissue; as, in some instances, enamel is certainly formed, the existence of the stellate tissue is obviously nonessential. When a tooth is moving to displace its predecessor, its sac travels with it, remaining intact until the actual attachment of the tooth to the bone by ankylosis.

VULCANITE POISONING.

By S. G. LEIGH, L.D.S.

YOUR extracts and quotations from the *Medical Press* relating to Dr. Woodman's cases of poisoning through wearing vulcanite as a base for artificial teeth, will excite a commotion among dentists like that recorded of the makers of the silver shrines for the worshippers of the Goddess Diana, inasmuch as it brings into disreputable and somewhat criminal position, the whole mass of dentists in England and other countries, unless the cases enumerated are proved to be quite exceptional and the rubber from which such cases were made was of the very worst kind.

In the absence of these extenuating circumstances there must have been a grievous amount of criminality tolerated for a long time unexposed, not easily got rid of, by those who have used it in their practice so continuously. It seems an anomalous cirsumstance that such palpably injurious effects as those enumerated should not have been

frequently observed by the medical profession—doubtless millions of cases are in daily wear—and that all visible injurious results should escape the observation of a class of dentists, who, one would think, could not fail to observe them, and if no higher motive had moved them to abandon the use of vulcanite, their status and common policy, it is natural to suppose, would have induced them wholly to abandon the use of so dangerous an article for ever. I remember well when the vulcanite was first introduced in Dentistry, how very much it was objected to by many, whose practice permitted them to charge very high fees, —the objection was sufficiently transparent to mistake the fear that it would cheapen the production of artificial appliances, and be taken up by those who, working for moderate fees, would thereby induce the public to look after their dentists' charges, although at the same time others whose practice lay principally among the aristocratic classes, while using vulcanite, made charges equal to the pieces on gold; one such case came under my own care for repair, in which a very small lower of five teeth on thin vulcanite was charged eleven guineas, so that while some professing to repudiate the article, the Dentist took care to profit largely by using it. Without either boasting or exagerating, I can truly affirm that I have supplied near 8,000 vulcanite cases during the last 27 years, and that with the exception of about three months' absence from home for recreation, and seven months confinement to a sick room in 1863, I have seen every case so supplied and every mouth so fitted, and can assert with equal truth that I have never discovered one case in which some independent abnormal or morbid condition could not be clearly traced as the cause of disease, other than that of wearing vulcanite. In those cases where secondary symptoms of a certain character were unmistakeable, I never supplied a single vulcanite case: or where the mucous membrane of the mouth was in an unhealthy state, I either supplied a gold, platina or palladium plate, this may in some degree account for the absence of those results Dr. Woodman enumerates. I am led, therefore, to think it would be only fair towards the dental profession generally, the manufacturers of rubber, and the Dental Depôt Proprietors, if the experience and opinion of other dentists could be collected and expressed, before the public mind

is alarmed, and the whole mass of dentists and all concerned are subjected to wholesale condemnation and suspicion.

The statements of Dr. Woodman do not include any remarks or observations on the evil effects produced by the vile trash used by some unprincipled dentists for metallic plates. I have a number of cases in my possession, not many shades better than brass, also in silver, in which copper seems to form the larger proportion. I have examined hundreds of cases in which from the use of base metal, the unhealthy state of the saliva from its acidity had corroded and almost dissolved the entire plate.

Surely in bringing indirectly such charges against vulcanite as a base for teeth, such malpractices should not escape with impunity. It has long been the practice of most dentists to use black rubber for the entire palate, only using the pink or red rubber for the parts visible, thereby reducing to a minimum the quantity of that which has been objected to.

I take the liberty to offer these observations (founded on my own unremitting watchfulness) bearing on circumstances deeply affecting the credit of all dentists, and if any use can be made of them for good they are much at your service.

Leeds, 6, *Portland Crescent.*

ABSOLUTE ALCOHOL.

By JAMES STOCKEN.

THE use of drying agents for the cavities of teeth having been recently brought under the notice of the profession, and absolute alcohol generally admitted to be the best agent, I beg to suggest to the members of the profession, a ready mode of procuring it, namely, the addition of carbonate of potash to the ordinary rectified spirits of wine, in the proportion of one of the former to four of the latter. Owing to the great affinity carbonate of potash has for water, it will abstract the water from the spirit, not entirely, but sufficiently for all practical purposes. This is a plan I have adopted, and is within the reach of all, whereas to procure it in the ordinary way by distillation with quick lime, is not.

33, *Euston Road, London.*

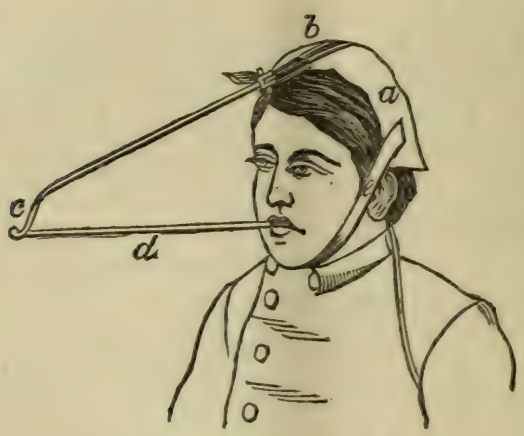
A TOOTH REGULATING MACHINE.

By Dr. POTPESCHNIGG, of Marburg.

(Translated from the Deutsche Viertel-jahrsschrift für Zahnheilkunde for January, 1875).

THE difficulty often experienced in bringing an upper front tooth from within the normal arch even with its neighbours; the frequent complaints that children will not wear a machine in the mouth, or with difficulty can be watched, and the circumstance, that for every individual case a new contrivance must be made, led me to the construction of the accompanying machine.

Description:—(*a*) is a well padded leather cap, which embraces the back of the head, and in which is sown firm a little below the external occipital protuberance in the direction of the sagittal suture forwards—a steel splint (1‴ wide, 1½‴ thick), which ends horizontally at (*b*) half an



inch away from the head, and, therefore, cannot press the same. To the middle of the posterior border of the cap, at the beginning of the splint, is attached a small brass ring, through which the cord (*f*) runs, passing on either side under the arm-pits backwards where the ends are securely tied, making it impossible to draw the cap over the face, (*e*) is a strong elastic bandage to be lengthened or shortened at will, and which prevents any lateral movement of the cap.

A round steel rod, the thickness of a pencil, 18‴ long is connected at (*b*) to the free end of the splint, through the

united ends runs a perpendicular rivet, on which the steel rod turns from side to side. The end of the rod (*c*) is bent upwards. A firm point is now secured opposite the teeth from which a traction power can be exerted on the tooth within the arch, which is effected by means of an elastic ring. This traction acts on the steel rod like a weight suspended at (*c*); that is, it causes at (*b*) a fixture or propping of the joint, whether it have been moved either to the right or left. If now the tooth be embraced close to the gum by the elastic ring, and this is slowly stretched over the end of the rod (*c*), it is possible to move the point (*c*) 90° either to the right or the left, and it can readily be fixed at any degree desired. One is consequently in a position to draw the tooth, not only forwards but at the same time either to the right or left. The point (*c*) is so far off, that the patient can look at it without squinting. Unable to do more than point to a result, I now offer the following for consideration:—

1. The traction is constant and can be regulated.
2. The moving of the tooth ensues without periostitis.
3. The patient cannot interfere with the action except by removing the elastic, which is easily controlled.
4. The patient can eat, drink, talk and play about without risk of injury from a fall, as the rod can give way in either direction.
5. The contrivance is suitable for any case of the kind, as the cap can be reduced by tightening the bandage.
6. The whole contrivance costs three thalers.

The boy never complained of headache or pressure, and only once of an itching of the head after wearing the cap four hours.

[G. H.]

ODONTOMES.

(Traité des Tumeurs. Par Paul Broca).

(*Continued from page* 313.)

CORONAL ODONTOMES.

I give the name coronal odontomes to those which occur during the third period of the evolution of the dental follicle, that is to say, during the formation of the crown. Their appearance is then posterior to the normal appearance of the dentine caps, and anterior to the formation of the fangs. The characteristic of these odontomes is the presence of a well shaped crown, incomplete, but perfectly normal in its configuration, its volume,

and its structure, which is found on some part of the surface of the tumour (or even enclosed in it when the odontome exists in an animal provided with the organ of cementum). No one is unaware that dentine and enamel, once formed, are not susceptible either of hypertrophy, of being absorbed, or suffering extension. The hypertrophy, then, of the soft parts adjacent cannot, therefore, cause any modification in that portion of the crown which is already developed before the *début* of the pathological work. The result is, that the tumour, at whatever period of its evolution it is considered, always presents, somewhere, a portion of the crown, whose conformation and volume correspond to one of the normal phases of the coronal fluid. In man, and generally in all animals who do not possess the organ of cementum, coronal odontomes are always due to hypertrophy of the pulp. In the pachydermatous herbivora, they can certainly have the same origin, but they are generally the consequence of hypertrophy of the cementum organ.

We shall then successively describe *cemental coronal odontomes*, which are only observed in the herbivora, and pulpal (pulpaires) coronal odontomes, the only ones met with in the human subject.

This division corresponds exactly to that which we admitted for odontoplastic odontomes. If we substitute the epithet pulpal (pulpaire), for that of bulbous, it is because the cortical layer of the bulb, already dentified in part of its extent, has become perfectly distinct from the pulp, and remains in all this dentified portion impervious to the accidents of nutrition of which the pulp is the cause.

A. CEMENTAL CORONAL ODONTOMES.

The organ of cementum in the herbivora envelopes the organ of enamel, which, in its turn, is enveloped by dentine. The coronal cementum is, then, always really applied to the exterior surface of the enamel; we however divide the cementum into two parts, the *exterior cementum*, and the *interior cementum;* this, for us, very important distinction necessitates a few words of explanation. When we open, in a human fœtus, the follicle of an incisor tooth, the bulb appears in the form of a convex, or even conical papilla; but, in the horse, this papilla of the incisor presents at its summit a deep, narrow, and conical depression, a sort of calyx, upon the walls of which is found the organ of enamel, spread as a fine membrane, and below it a row of dentine cells, which characterize the cortical layer of the bulb. This depression, this calyx, which constitutes, later, the dental cornua is not empty, it is occupied by a prolongation of the cementum organ, which penetrates it under the form of a conical papilla; it is the *cemental papilla*. The accompanying cut shows this disposal. When dentification is being effected, it arises first upon the most projecting portion of the bulb, all around the base of the cornua, later, extending gradually over the remainder of the surface of the bulb, it descends over the exterior part of this surface, marking out the contour of the crown and its depression, and forming round the cemental papilla a cornu of dentine, later covered with enamel. This cornu is first open, as in (i.), at the base of the pulp, but dentification making progress, it is completely closed, and from that time the cemental papilla is definitely separated from the pulp by a plate, more or less thick, of dentine covered with a layer of enamel. Soon the cementum, in its turn, forms round the enamel; it forms everywhere where the cementum organ exists, that is to say, that

in one part it constitutes a complete envelope round the crown, and that in another it is prolonged to the base of the cornu, which it finally completely fills. In such manner is the cementum disposed when the tooth leaves its alveolus, but the tooth soon becomes worn out; the layer of cementum which covers the grinding surface wears first, the enamel laid bare wears out in its turn, and finally the dentine. From that time the continuity which existed between the *exterior* and *interior cementum* which fills the cornu is interrupted. The interior cementum shows itself upon the grinding surface like a marbled centre framed in a line of enamel, which separates it from the dentine; the form and volume of this marbling naturally varies according as to whether the tooth is more or less used, and allows of approximate determination of the age of horses who have already all their teeth.

To simplify the description I have supposed the case to be of a tooth with a single cornu. Upon the molars, the existence of several cornua singularly complicates the disposition of the constituent parts of the tooth, but, definitively, the phenomena are the same. That granted, the cemental coronal odontome might be due to hypertrophy of that part of

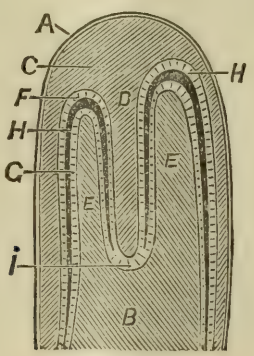


Fig. 16.

the cementum which surrounds the crown, or to hypertrophy of that part of this organ which is inside the cornua, or, finally, to hypertrophy of the entire cementum. These three varieties I shall call exterior cemental odontomes, intra-coronal cemental odontomes, and mixed cemental odontomes.

The specimen represented by the figure 17, shows an example of the first variety; we see at *aa*, *b*, a cut of the crown of a molar tooth, a crown whose development is not accomplished, but of which that part formed is perfectly regular. Before all preparation, the grinding surface of this crown, *aa*, and one of the lateral surfaces, *a*, *b*, may be perceived on the tumour; the rest is englobulated in a voluminous, bunchy, irregular, (*cc*, *d*, *cc*,) very hard, and homogeneous mass, which, upon the section, presents quite the appearance of dentine, but which, examined with the microscope, is exclusively composed of cementum. The origin of this odontome is unknown, but the grinding surface of the crown being worn, we know that the tooth had been erupted and had been used for mastication. It is clear that the crown had been, in a great measure, formed when the disease occurred on the organ of the exterior cementum; this organ becoming hypertrophied, constituted a tumour which comprehended

the base of the pulp, whose atrophy it determined, and which thus arrested the growth of the crown. The lower part of this, then, is found later, imprisoned in a voluminous mass of cementum, and the formation of fangs rendered impossible.

Another specimen from the same museum, represented by figure 18, is an example of intra-coronal cemental odontome. This monstrous tooth, like the former one, was erupted, and its surface, *aa*, worn. The part *aa*, *bb*, is the almost normal crown of the fourth upper molar of a horse; below* this part, which is not at all deformed, the crown is enlarged and dilated to lodge an enormous, hard, slightly yellowish mass, which adheres

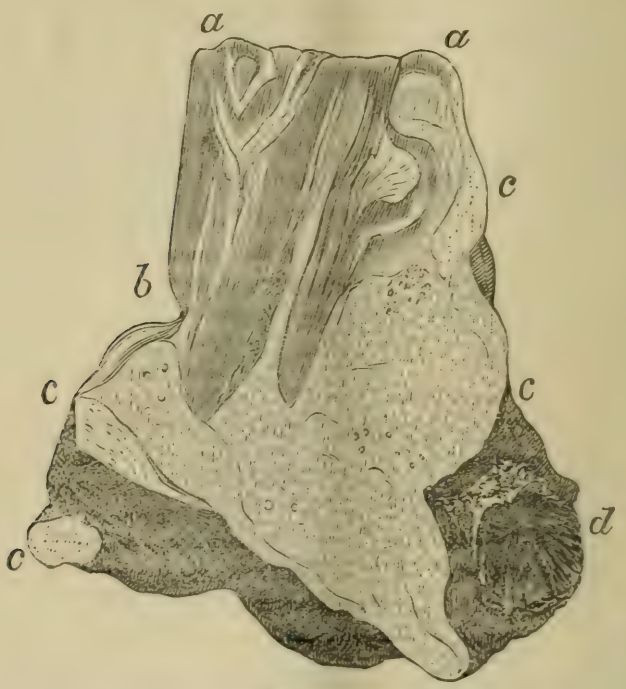


Fig. 17.

firmly to the deep side of the dilated crown, and which above, at *o*, is continued in the crown as far as the triturant surface in the form of a vertical column; this vertical column, which may be recognized by the naked eye, is constituted by the cementum which fills one of the dental cornua. This remarkable specimen, collected in 1857 by M. Méguin, veterinary surgeon to the imperial guard, and given by him to M. Bauley under the title of "Spina Ventosa Dentaire," was mentioned by the latter in the article "Teeth," in the "Nouveau Dictionnaire Vétérinaire." Before describing it, M. Bouley† consulted MM. Robin and Magitot, who

* Although the tooth comes from the upper jaw, I have thought it right in my description to conform to the custom which consists of designating the different parts of the teeth according to the situation that they occupy on the teeth of the lower jaw. I call, then, the upper part that which corresponds to the dental arch, and the lower part that which corresponds to the floor of the alveolus.

† Bouley et Reynal, *Nouveau Dictionnaire, pratique de médicine de chirurgie et de hygiène vétérinaires*, t. iv., p. 638. Paris, 1858.

after some partial microscopical preparations, described in the following terms the succession of the phenomena of the development of the tumour. "1st, Organic affection of a division of the dental pulp, with hypertrophy of the organ. 2nd, Distension of the pulp cavity by hypertrophy of the organ. 3rd, Disturbances in the production of dentine, which, instead of being placed in regular layers, is deposited in the form of stalactites covered with cementum, the organ producing this substance remaining healthy." Thus, according to MM. Robin and Magitot, it is a pulpal (pulpaire) odontome and not a cemental odontome. But two serious objections rise against this interpretation. On the one hand, all that is known upon the physiology of dentine and cementum prove that these tissues, once formed in continuous layers, are not capable of distension; we cannot, then, admit that the pulp could, in hypertrophying, dilate the rigid and undilateable cavity which surrounds it. On the other side, it is impossible that the organ of cementum, *remaining healthy*, could deposit cementum in the pulp cavity, for if there is cementum called interior, in opposition to that which forms the exterior layer on the crown, this cementum is only interior in appearance; it penetrates into a depression of the crown, but this depression is separated from the dental cavity, that is to say the pulp, by a thick layer of enamel and dentine. To reconcile these difficulties, I asked my friend and colleague, M. Bouley, leave for M. Bourgogne, junior, to make a microscopical section comprehending the whole surface of the specimen; this permission was liberally accorded to me. I can prove thus: 1st, That the intra-coronal odontome is exclusively composed of cementum. 2nd, That it is in uninterrupted continuity with the cementum column which fills one of the dental cornua. 3rd, That it is everywhere and all over covered with a layer of enamel, perfectly regular, which entirely separates it from the dentine. For example, if we study at the point *c*, the disposal of the layers we shall find from without inwards, 1st, The exterior cementum. 2nd, The exterior enamel. 3rd, The dentine. 4th, The interior enamel. 5th, The cementum mass which constitutes the intra-coronal tumour. Thus, there can be no doubt that this cemental tumour was developed in the lower extremity of the prolongation that the cementum sent to the bottom of one of the dental cornua; this anatomical fact is perfectly established. In this manner, then, the tumour was produced: the upper part of the crown was already formed, but the tubes of dentine and enamel which descended to the interior prolongations of the cementum not being complete, and the cornua not being yet closed (see fig. 16), one of these cornua was attacked by hypertrophy. Above, at the side of the grinding surface, the cementum surrounded by an inexpansible sheath could undergo no expansion, but at the lower extremity, where it was only separated from the pulp by the enamel organ, a fine soft membrane, and by the cortical layer of the bulb, no obstacle was opposed to its development, and it could increase freely both in size and length. In the first sense it dilated all the exterior layers of the bulb layers, which, still soft and expansible, undergo this ampliation without difficulty, still preserving their continuity, their structure, and their odontogenic properties, the crown, therefore, could continue to grow. It was prolonged the length of the dilated cortical layer, and ought to have been considerably enlarged at the level of the tumour, upon the contour of which it was exactly moulded. This dental shell once formed round it, the hypertrophied tumour ceased to increase in bulk, but there was nothing to hinder it from being developed in length. It did not

meet on the side of the base of the tooth any serious resistance; the enamel membrane and the cortical layer of the bulb, which separated it from the pulp, only opposed an illusive barrier; these two layers between the tumour and the pulp were atrophied and disappeared, so that the cavity of the cornu could not close and remained definitively in communication with the cavity. It was then that the tumour became the seat of a dentification exclusively cemental. As to the pulp, in losing its cortical layer it lost its property of dentification, it thus remained soft; it is this which doubtless filled the large and irregular excavation which digs into the base of the tooth. A similar dispesition rendered the completion of the crown impossible, and, with still stronger reason, the formation of fangs; the tooth no less made its eruption, which is not astonishing when

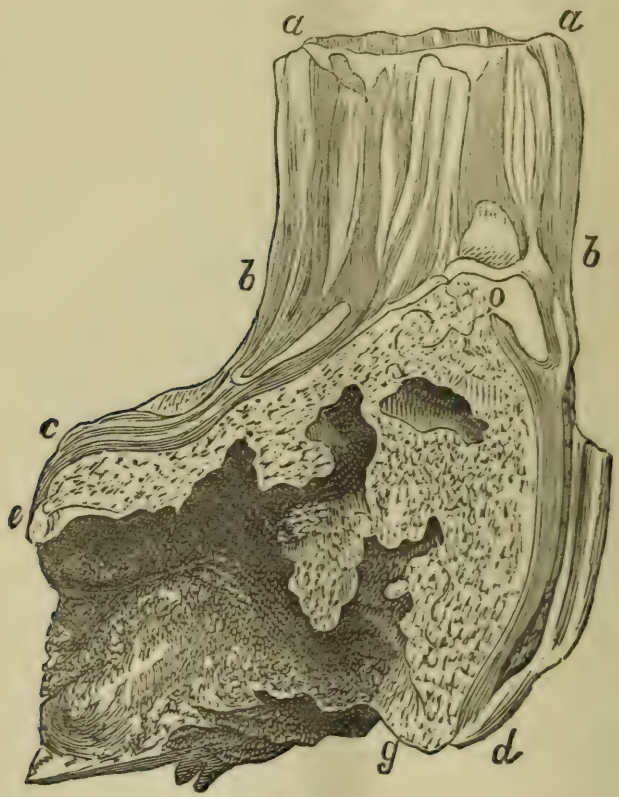


Fig. 18.

we consider that, in a horse, eruption is effected before the development of the fangs; the tooth then took its ordinary place, and as that part of the crown which is seen on the exterior was regularly formed, the dental arch appeared quite normal. The horse lived to the age of eight years, but then occurred the disturbance which was attributed to the bit, the animal was killed, and at the autopsy it was found that the symptoms were due to suppuration of the maxillary sinus, into which the base of the tumour had made an irruption, after having destroyed the bony partition which separated the sinus from the dilated alveolus. I have extracted these particulars from a note which M. Méguin was kind enough to send me.

Another specimen, deposited in the museum of Alfort by M. Bauley, under the number 163B, furnishes an example of the cemental odontomes which I have called mixed, because they occupy at the same time the exterior and interior of the crown. The cementum organ is entirely hypertrophied almost at the commencement of dentification, at an epoch where the crown is not yet constituted, except by isolated cusps. Three of these cusps, perfectly characterized by their structure and by the regular disposal of dentine and enamel, may be perceived on the upper surface of the tumour. A vertical section has shown that these three cusps are continued in the thickness of the tumour in the form of longitudinal columns, where the very regular disposition of enamel and dentine exactly reproduces the constitution of dental crowns. But these three columns are isolated and lost in the midst of an enormous mass of cementum, which envelopes and separates them. In measuring the distance which separates the three cusps, we find that it is five or six times more considerable than the breadth of the largest dental cornu. It is the consequence of hypertrophy of that part of the cementum which penetrates the cornu. This organ becoming tumified, has pushed excentrically against the cusps which are already formed but not yet fused. The extra-coronal part of the cementum is hypertrophied at the same time: it has resulted after the dentification of a cementum mass everywhere continuous with itself, and in the middle of which are dispersed the three pieces of dislocated crown.

All the specimens which are described as cemental coronal odontomes have been collected from the horse, and in turn, all the coronal odontomes of the horse which I have been able to procure, are cemental, with one exception; I shall, later, return to this peculiarity.

ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

Ordinary Monthly Meeting, March 1st, 1875.

J. Tomes, Esq., President, in the Chair.

The minutes of last meeting were read and confirmed.

The President said that Dr. Woodman had brought before the Society a matter, the importance of which in a public or professional point of view could not be exaggerated. He hoped that everyone present would contribute as concisely and accurately as possible his experience on the subject. The rubber had been so valuable in point of practice and in many respects so much better than anything that had preceded it, that its use would no doubt be given up with great unwillingness. Still, if it should be shown that vulcanite produced the poisonous effects described by Dr. Woodman, he was sure the dental profession would, one and all, abandon its use.

ON THE COLOURING MATTER OF THE PINK AND RED VULCANITE USED IN DENTISTRY, WITH REMARKS ON THE OCCASIONAL OCCURRENCE OF SYMPTOMS OF POISONING, PROBABLY DEPENDENT UPON THE VERMILION USED AS A PIGMENT.

By W. Bathurst Woodman, M.D., M.R.C.P., &c.

Mr. President and Gentlemen,

The cases and remarks which form the basis of this paper were published under the heading of "Hospital Reports" in the *Medical Press*

and Circular of December 9th, 1874. At the request of Messrs. Sewill and Turner, I was led to make fresh experiments; in the meanwhile, one or two fresh cases, though of minor severity, have come under my notice. I am also greatly indebted to Mr. Turner for the appendices, and for valuable information on details of manufacture. Also to my colleague, Dr. Barrett, for various specimens, &c. Two disclaimers seem due to my audience and to myself, viz. :—

1. Whilst I alone am responsible for the experiments, and my first case was observed in 1862, whilst Dr. Taylor's case [" Principles and Practice of Medical Jurisprudence," 2nd ed., Vol. I, p. 290] was not noted till 1864, and Dr. Wells' [" British Med. Journal," Sept. 5, 1863] about a year before, yet I wish to claim no priority as to discovery. The references in the appendix show that the danger was foreseen, and that American dentists and physicians are now discussing it.

2. I have no wish to make a *sensational* matter of this question. It appears to me evident that the cases I am about to describe are *more or less exceptional.* In other words, whilst large numbers of patients are wearing, and have worn, these vulcanite plates for years, *only a small percentage of them have suffered at all severely, or suffered at all.* When the first case of " ptyalism, rupoid eruptions, stomatitis phagedenica, and mercurial erythism," in a patient wearing one of these plates, was observed by me in 1862, I satisfied myself that the colouring matter in that instance was vermilion. When another case occurred in 1864, I obtained a number of pink and red rubbers from various quarters. Others were given me by Dr. M. H. Payne, and since then by Dr. Barrett—both soft and hard. One and all, whether pink or red, were coloured with vermilion, the red sulphide of mercury. I came to the conclusion that the deeper tinted ones usually contained about *one-third* of this pigment, or about 33 per cent. The proportion can only be approximately judged by the colour. I was surprised to find this pigment in *all* the samples examined. Mr. Turner has given a very reasonable explanation—namely, that there is scarcely any other colouring matter known of the desired tint which will withstand the hydrogen-sulphide, and other sulphur compounds (such as SO_2) generated in the process of vulcanising the rubber. Without wishing to enter much on technical details, I may remark that the *basis* material of the rubbers was not always the same—in other words, some were almost pure caoutchouc [I now disregard the pigment], whilst others were mixtures of other things. The second point is that different specimens of the hardened product, or vulcanite—in other words, the gums and palates from different dentists, or different workmen even—varied very much in their texture. Some had a porous, loose structure, with little blisters and cracks on the surface, and in the midst of the spongy mass of the inside there were sometimes collections of the *pigment pure and simple*, sometimes crystalline, sometimes amorphous. I am told these faults are capable of being avoided by proper apparatus, and a proper way of working. I have been led to believe that, at least in the provinces, some dentists only use a common oven to harden their plates. Such a method seems very liable to lead to " faults." It was, with one exception, " faulty " plates which gave rise to the cases of mercurial poisoning observed by me. In the exceptional case, the plate worn seemed quite a finished specimen of dental art. [After some details as to the sources of Vermilion, the paper proceeds]. The native product contains amongst other impurities slight traces of arsenic, in the form of

sulphide chiefly. One or two of the samples of rubber examined also contained traces of arsenic, but traces only. Orfila, Mialhe, and others, assert that vermilion is an almost *inert* substance. The arguments adduced, or arguments of like kind, would equally apply to calomel. The experience of the men who work the Cinnabar mines, Dr. Sutro's case of poisoning by the vapour of vermilion [*Medical Times and Gazette*, September 27, 1845—apparently the earliest in modern literature], and the experience of surgeons and physicians who use it in the form of vapour for syphilis, tend to show that in this form at least it is anything but an inert substance. Mialhe has shown that calomel, digested in solutions of alkaline chlorides, is partially converted into corrosive sublimate. My experiments lead me to the conclusion that a small quantity of corrosive sublimate is formed when vermilion is digested for some time with an alkaline chloride, and heat. I am not sure of the exact decomposition; probably something like this—$Hg.\ S + 2\ Na.\ Cl. = Hg.\ Cl_2. + Na_2\ S + S.$ Now, chlorides are not only present in normal and diseased secretions, but many of our patients use large quantities of salted provisions, or eat much of this condiment with their food. Again, portions may be worn off the vulcanite plates containing the pigment, and carried into the stomach, there again to meet with chlorides and a temperature of about 38° cent. I must own, however, that in fair wear of well-constructed plates the quantity worn off is very slight indeed. More often, I think, portions of unmixed pigment escape from cracks or fissures, either in the solid form, or in the shape of vapour. It is noteworthy that in all my cases, and in nearly all those told by others, the symptoms of poisoning were first localised in the mouth. We must probably allow something for slow molecular decomposition, and, perhaps, the carbon of the vulcanite, with the bisulphide of mercury and water or saliva, form a constant battery, which is slowly but continually liberating mercury from the vermilion. Whatever may be the way in which the vulcanite thus coloured acts injuriously, I think there can be little doubt it sometimes does so. Upwards of a dozen cases have now been seen by me, and others are reported from America. The grounds or evidence which induced me to refer them to the use of pink and red vulcanite are four—viz. (1), the symptoms correspond to those of chronic or sub-acute mercurial poisoning, coupled with (2) the absence of other adequate cause, or "sufficient reason," except the pigment in the vulcanite, no other source of mercurial poisoning being discoverable. (3) The discovery of mercury in the saliva or urine of some of the cases. (4) The remarkable agreement in the time at which symptoms appeared in most of the cases—from six weeks or two to three months being the common time. Above all, the *disappearance* of the symptoms when the vulcanite was removed, and their *reappearance* when the wearing of the plate was resumed. In one case this happened three times.

The symptoms observed by me are as follows:—

I. Muco-cutaneous symptoms. Of these the chief are—Stomatitis, salivation, fætor of breath, a coppery taste in the mouth, anorexia, indigestion, diarrhœa [preceded by constipation], sometimes dysentery, herpes, lichenoid and eczematous eruptions, ecthyma, furunculi, and, perhaps, pemphigoid and rupoid sores.

II. General symptoms, the chief of which were—(1) A general condition of malaise, (2) extreme muscular weakness, (3) poverty of blood, (4) pyrexia ("mercurial fever"), (5) feeble pulse and diminished power

of the heart, (6) marasmus [sometimes corpulence, from formation of lowlier form of tissue].

III. Nervous symptoms, of which the chief are—(1) Irritability of temper, (2) want of sleep, (3) extreme restlessness and mobility, general hyperæsthesia—in later stages some anæsthesia, (4) hysterical symptoms, hypochondriasis, bordering on insanity, (5) illusions, and sometimes delusions, (6) tremors, as in the case of gilder's palsy. [In fatal cases from the ethyl and methyl compounds of mercury, the mind is still more seriously affected]. (7) Loss of power in both upper and lower extremities; loss of co-ordinating power, in one case resembling writer's cramp. I have not seen what is commonly called paralysis, or complete loss of muscular power. *We must not expect all these symptoms in any one case.*

The experiments referred to are, besides those as to the composition of the plates themselves—(1) Those showing the easy volatilization of vermilion at comparatively low temperatures, vulcanite plates under water or saliva at temperatures varying from 100° to 150° Fahrenheit—furnishing vermilion on the bibulous paper covering the glasses—after some hours; (2) Experiments showing the solution of the pigment in saliva. Portions of vulcanite plates were digested in real and artificial saliva for some days at a temperature of 100°. The fluid gave by electrolysis a deposit of mercury on a copper plate. [Other experiments with sulpho-cyanides alluded to.] (3) Experiments to show the behaviour of vermilion in stronger solutions of chloride of sodium—these have already been alluded to—also with potassium and ammonium chlorides. (4) Experiments with acidulated saliva, the results of which were mostly negative.

The suggestions offered as remedial, or tending to remedy these evils, are—(1) Great care in the preparation of the rubber, and the hardening of the plates, so as to avoid "faults." (2) Leaving off the plates at night; great cleanliness; using soft water to cleanse them; occasional use of myrrh and tannic acid lotions. (3) It has occurred to me that it might be possible to glaze or *glass* over the plates, when finished, with some silicate, or to use some varnish. (4) After all, the great desideratum seems to be to get rid of vermilion, though I fear there are some objections to *rubber per se*, as its contact with the mouth is too close. Perforations, if they relieved the mouth, would increase the danger from vermilion. The appendices are:—No. I, "Extract from Mr. Putnam's paper read April 2, 1859;" "Transactions of the Odontological Society," Vol. II, pp. 141—157, showing that the danger was *anticipated*, though denied. No. II, "Extract from a paper read by Mr. Childs on 'Superheated Steam,' &c., June 4, 1859;" from the same vol. (pp. 197, 198), explaining the *porosity in rubber hardened by dry heat.* No. III, from a paper on "Hard Rubber," by Mr. R. Hepburn. "Odontological Transactions," Vol. V., p. 185, alluding to the anticipation of evils from this source, and combating the possibility of such. Appendix IV. is from the "Pennsylvania Journal of Dental Science," September, 1874, reporting several speakers at the Southern Dental Association at St. Louis, July 28, 1874, as affirming the injurious effects of red rubber. Appendix V. is from the "Dental Cosmos," vol. xvi., No. XI. (November, 1874), p. 601, showing that opinions were divided on this point in the American Dental Association.

[For all these extracts I am indebted to Mr. Turner].

Mr. WEISS said that it would not be possible to over-estimate the importance of the subject which had been brought forward by Dr.

Woodman. He thought that great care should be taken not to jump too readily at conclusions simply because there was irritation of the mouth. Some years ago an Italian lady called upon him wearing a vulcanite piece made of the ordinary red rubber; it was strengthened with what appeared to be a gold plate, and she had worn it for some time. She complained not only of irritation of the mouth, but at the same time of a disagreeable taste. He advised her to discontinue the use of the plate, and a piece was made in black rubber which she substituted for that in wear; the symptoms subsided, and he should have taken no further notice of the subject had he not found by an accidental cutting into the set, that the plate with which the work was strengthened was made only of gilded brass. The patient had worn it for some time, and it was not until the gilding had worn off that the unpleasant symptoms commenced. Upon enquiry, he found from the lady that the plate was made in Rome, and the maker's name he believed to be respectable. He (Mr. Weiss) could only hope that such an occurrence was accidental. As regards the hardening of rubber, every one was aware that it could be hardened as readily by dry heat as by steaming. He thought it was very wrong to employ the red rubber, more particularly in making blocks; nothing could surpass the old black rubber, particularly when it came in contact with mineral. It was well-known that it was a common practice to employ vulcanite for these blocks, and sometimes it had been found that the red rubber triturated to a considerable extent and was no doubt carried into the system. About ten or fifteen years ago he advocated very strongly the employment of silicated India rubber for the making of those blocks; a good many experiments were made at the time, and he was very well satisfied that a very good substitute for the old bone block could be made of silicated rubber that might be made to look respectable, and at the same time to offer a greater resistance than the ordinary vulcanite.

Mr. C. S. Tomes said he would probably have kept silent, seeing the subject was one upon which older Members of the Society had more experience than he had; but, Messrs. Ash who had gone into the matter with their usual energy, had placed in his hands a certain amount of material for communication to the Society, which bore so strongly on the subject that he was anxious those materials should be before the meeting at an early period of the evening. The question seemed to him to require consideration from two sides: the one, the *a priori* possibility or probability of poisoning through this mercurial compound; the other, whether Dr. Woodman's cases were cases of genuine mercurial poisoning. He hoped that Dr. Woodman would not think that he was making a personal attack upon his paper; but the diagnosis of those cases was oftentimes, necessarily, a matter of doubt which could only be cleared up by experiment, and by a large number of cases; and, therefore, it was competent to others to form an opinion of the cases. First of all, as to the *a priori* probability of poisoning, Dr. Woodman had referred to the usual opinion that vermilion taken internally was inert. No doubt it was; but, that did not exactly prove that taken in small quantities and repeated indefinitely in small doses over a large space of time it would not become poisonous. If lead be taken internally, in drinking water over a large space of time, poisonous effects are thus obtained. As to the effects of vermilion in fumigation, there was an opinion, supported by good authorities, that these effects were due, not to vermilion itself, but to the products of the

actual decomposition of the vermilion by heat. Messrs. Ash upon enquiring of the vermilion makers as to this matter, learned from them, that men engaged in packing vermilion, and who were often red from head to foot, did not get any injurious effects from it. The experience of one of the partners in a firm which turned out enormous quantities of vermilion, was, that for thirty years he had never known any poisonous effect to arise amongst these workers on vermilion. That was a fact which appeared to him of the utmost importance, and it was not negatived by the fact that workers in cinnabar mines incurred mercurial poisoning; because there, mercury was present in other forms than the extremely inert form of vermilion. Any one working at chemistry knew what an exceedingly refractory substance vermilion is. The quantity of vermilion that could be worn off a plate, even although worn for a great number of years, must necessarily be very small. The number of grains in a few weeks would be infinitesimal. The average secretion of urine in the bladder of an adult might be put at 50 ounces a day. He was at a loss to understand the quantity of mercury which Dr. Woodman appeared to have found in the sample of urine when he said he found mercury enough to silver a sovereign. Dr. Woodman had laid much stress on mercurial compounds being volatile and related an experiment in which he succeeded in volatilising vermilion from a specimen of vulcanite in saliva and water. The experiment was a very remarkable one, and he (Mr. Tomes) was not able to explain it from a chemical point of view. Dr. Woodman also spoke of calomel in the presence of salt or chloride of potassium, being partly decomposed and forming a soluble corrosive sublimate. Calomel, as was known to chemists, was not a very refractory body It was by no means difficult to decompose it by a great variety of agents. There was a great deal of difficulty in decomposing vemilion so that the comparison of the action of haloid salts on calomel taught nothing as to the action of similar salts on vermilion: and although Dr. Woodman suggested a hypothetical formula by which such a reaction might be explained, he would submit that the use of a chemical formula was not for hypothesis, but for explaining and demonstrating reactions that had been found to take place. Then again he suggested that saliva with vermilion in the mouth might form a voltaic battery perpetually decomposing vermilion. It might, but there was no experimental proof that it would, it was pure hypothesis. Messrs. Ash who were deeply interested in this question, had placed the matter in the hands of Dr. Attfield, Professor at the Pharmaceutical College, Bloomsbury Square, who had made a large number of exceedingly careful experiments, which he had communicated in the form of a Report which would probably be published. To some of his experiments he would call attention now. Portions of vulcanite rubber were shredded into fine fragments and placed in solutions. First the fragments were kept in cold saliva for three weeks and tested at intervals, with no result. They were kept again in saliva at a temperature of 98 and tested at intervals for three weeeks with no result. They were kept in a solution of chloride of potassium and chloride of sodium of such strength as to imitate saliva as nearly as possible, with no result. They were placed in acidulated pepsine made to imitate the gastric juice as nearly as possible, with no result; the length of time was three weeks, and the temperature as nearly as possible that of the body. They were placed in five per cent caustic alkalies, caustic soda, and ammonia, with no result.

Placed in vinegar, five per cent acetic acid, no result. In nitric acid, one to five of water, sulphuric acid, one to seven of water, hydro-chloric acid one to nine of water, with no result, except in the case of the hydrochloric acid, in which traces of metal were found after the lapse of two weeks, but so minute, that Dr. Attfield was unable to say what the metal was. Dr. Woodman had not detailed by what tests he was satisfied of the presence of mercury. There was a matter which the Messrs. Ash had looked into in conjunction with Dr. Attfield, and that was, how far it was possible that the vermilion contained in plates might be decomposed by other metals. The metals used for strengthening plates were gold of 18 or 16 carats, platinum, dental alloy, 9 carat gold, german silver, copper, iron, tin, and lead, and to that Mr. Weiss had added, in the case he had quoted, gilded brass. If vermilion at a high temperature was brought in contact with some of these metals, it would be decomposed, and mercury would be set free; the sulphur of the vermilion would combine with these metals, what would become of the mercury he could not tell, he fancied a very small portion of it would remain in the plate, but that was merely hypothetical. There were a few things in reference to the cases mentioned in the paper that struck him as requiring comment. In the first place, a good deal had been said about the state of the mouth, but nothing whatever as to the possible sources of irritation existing in the mouth, nothing as to the existence of stumps and alveolar abscesses, and not much as to the state of cleanliness in the mouth, although Dr. Woodman had remarked that all, save one, kept their mouths in a more or less uncleanly condition; nothing had been said as to the fitting of the plates, or whether or not they had ceased to fit. Then many of the symptoms corresponded very closely with syphilitic ulceration of the mouth, in which, by the way, he had often seen profuse salivation. In other forms of ulceration in the mouth, in stomatitis, or in almost any case of irritation in the mouth, there would be a reflex flow of saliva; pain in excavating a tooth would often induce a gush of saliva, so in the same way a more chronic irritation would induce a more or less constant flow of saliva. Of the cases reported, two were noted as being syphilitic; these had, in all probability, been treated with mercury, but to what extent did not appear; in the other cases there was no note made as to the presence or absence of syphilis; it was not a matter, however, which a hospital patient usually admitted with great willingness; if asked if they had ever had it, they would say no, but if they were asked when, would probably mention a particular date. He was rather at a loss to understand the number of Dr. Woodman's cases. The number (a dozen) would lead to the inference that this was a common thing. If it were a common thing, how was it that they, as dentists, were not familiar with it? some of them, surely, would have put two and two together and coupled the appearance of those symptoms with the wearing of rubber plates. Dr. Taylor, in his book on "Jurisprudence," noted a case of spurious salivation which was induced simply by the insertion of a new set of teeth; the irritation produced in the mouth induced what was, to all intents and purposes, salivation, where there was no possibility that it could be due to any poison. It was quite possible that the appearance or re-appearance of these symptoms were, in some cases, due to misfitting plates; he had, however, seen within the last two or three days a case of ulcerated stomatitis occurring underneath a perfectly well-fitting gold plate, but the mouth was not kept in

a properly cleaned condition, and to that want of cleanliness he attributed the ulcerations in the mouth. A good many of the reported symptoms looked as if the cases were syphilitic, and if so, they had probably been treated with mercury. He did not agree with Dr. Woodman's comparison that the effects produced by tight fitting plates in the mouth resembled those caused by a finger stall on the skin, because the effect of the finger stall on the skin was generally one of maceration, owing to the confinement of the sweat. He did not think an analagous effect would be obtained by confining the secretions of the mouth, although if the plate were kept in continually, no doubt unpleasant effects would be produced. Another thing struck him as inconsistent in the case quoted, where a sort of party coloured plate was worn, and irritation caused at the parts where the red rubber touched. If there was one thing that was known about vermillion more than another, it was that it was locally an inert substance, whatever it might be taken internally, even if it were possible it could cause constitutional poisoning. It was well known that pure vermilion applied to sores did not produce any effect whatever. It was not an irritant, and he was at a loss to account for that case; it was a mystery to him, unless it were due to some peculiar physical property in the rubber.

Mr. Oakley Coles said, that since the 27th of January, he had paid some attention to the subject before the meeting. At that date he had the following different preparations put in solution:—No. 1. Bow-spring unvulcanised, in common salt and water.—No. 2. Velum rubber vulcanized, in hydrochloric acid.—No. 3. Pink rubber vulcanised, in nitro-hydrochloric acid.—No. 4. Velum rubber vulcanized, in nitro-hydrochloric acid. After they had been in his consulting room since the 27th of January, he had to-day, March 1st, sent them to Messrs. Bell, of Oxford Street, and received the following report:—

"338, Oxford Street, March 1st, 1875.

"We have examined the liquid in the four bottles, labelled 1, 2, 3, and 4. With No. 1, 2, and 4, there is no precipitate with sulphuretted hydrogen, but there is one from the solution in No. 3. From the small amount of precipitate, we have not been able to determine satisfactorily if it is lead or mercury, but we believe it is the latter.

"We are, dear sir,

"Yours truly,

"John Bell & Co."

As a matter of evidence he thought it was desirable that this should be placed before the meeting, and he thought that the source from whence the statement came as to the result of the analysis, would bear sufficient weight to entitle it to consideration. He must confess, from his own observations, he had never seen any reason to come to the conclusion that vulcanite plates produced any injurious action in the mouth. He had two patients, sisters, who suffered from profuse salivation. They were of a highly nervous temperament, and were always suffering from some ailment, and both of them wore rubber plates. He had collected a quantity of their saliva, and having submitted it to Mr. Tribe, at the Royal Institution, he received the following report:—

"Royal Institution, February 26th, 1875.

"Both samples of saliva are free from mercury.

"Alfred Tribe."

There was one other point. He had been in the habit, for some time past, of using a fair quantity of elastic rubber, manufactured by Messrs. Ash, for making artificial velums. That rubber, after a time, was very apt to become soft in the mouth, and small fragments broke off, and were swallowed by the patient, but in none of these cases, where there was conclusive evidence of large portions having been taken into the stomach, had he seen any evidence that would lead him to suspect that there was anything approaching mercurial poison. It was an extreme case when rubber was taken into the system, and if the vermilion in it was poisonous, it might be expected that, in such a condition as that, some results would be obtained. As a matter of fact he had seen a number of cases, where people were anything but cleanly in their habits, without the slightest instance of any approach to mercurial poisoning. There was one other case which seemed to him of the utmost importance, with regard, not so much to the mistakes which might be made in arriving at a diagnosis of the condition of things, but rather as to the cause of the condition that was diagnosed. The case he referred to was at the present time in the London Hospital, under the care of Dr. Stephen Mackenzie. (For the following notes I am indebted to Mr. T. M. Hovell.) The patient was a girl aged 22, and was admitted January 16, 1875, with the following history. Two months ago she was quite well, but about six weeks ago had a pain in the lower part of the abdomen (the place pointed out is the right and left iliac regions) which got worse and worse, and for it she took "a lot of medicine." A doctor, on January 9th, said "that she had inflammation of the womb."

For about ten days previous to admission, she had headache, the pain being principally across the eyes.

Before admission, several small spots formed on the gums, from which "matter came when they burst;" "clotted blood" also came down between the teeth, at other times "matter mixed with blood."

Patient says that she has very bad teeth, and often suffers from tooth-ache and sore gums in consequence, but her mouth was never inflamed as it is now until about ten days ago.

Notes on admission.—Patient's breath has marked mercurial fœtor. there is some amount of salivation, the saliva collecting in the mouth during examination; the gums are red, granular, and bleeding between the teeth, many of which are mere decayed stumps. The tongue and lips are tremulous, the patient looks anxious and nervous, and the tremor has not the characters of mercurial tremor, as seen in men working in mercury.

There is slight tenderness about the neck and under the jaw, but no coarse enlargement of glands. The tongue is not swollen.

January 18th.—Patient's gums are very much better to-day; she has replaced her false teeth, four in number, which she was obliged to remove about a week ago, on account of the soreness of her gums, and has only worn for a few hours together since, on one or two occasions when she was obliged to go out. There is still slight tremor of the tongue, but it is not so marked as on the 16th instant.

January 22nd.—For the last two or three days, patient has called my attention to several small red spots around her mouth which are very irritable, this morning there is one about the usual size on her forehead. The spots are about the size of a pin's head, raised, and of a pinkish-red colour, which extends to the skin around the base of each spot, and fades

away gradually, having wholly disappeared at about two or three lines from the base of the pimple. Patient states that they come out more freely, and feel more irritable when she is hot, and that one night they came out all over her body and limbs, and the irritation from them prevented her sleeping.

January 23rd.—The spots are not to be seen which were out around her mouth yesterday.

February 6th.—Nausea, but no vomiting. Tongue bare of epithelium in parts producing a very raw appearance.

January 22nd.—The patient was suffering from some pelvic mischief, probably ovaritis, for which she had been treated energetically, presumably by mercurials.

Taking the evidence as it stood, and with the presence of a vulcanite plate, one would be apt to come to the conclusion that the patient was suffering from a well-marked case of mercurial poisoning. All the evidence, so far as it could be taken, was conclusive on that point. But here comes the fact: she was not wearing a vulcanite plate, but a dental alloy plate; and although she gave no history of ever having taken mercury, she was suffering from mercurial poison, which had been taken, no doubt (she was a prostitute), for abdominal pains. That shewed how necessary it was to have the most absolute proof that poison was being administered through an unmistakable medium, before it could be determined that certain symptoms were the result of a poison which might have been administered under these conditions; in other words, there must be the most absolute proof that the poison was the result of wearing the vulcanite plate, before it could be shewn that because a patient exhibited symptoms of mercurial poison when wearing a vulcanite plate, that therefore the patient was being poisoned by the vulcanite plate.

Mr. Coleman said that considering the immense comfort often rendered to patients by the employment of vulcanite, dentists might be perhaps a little too strongly prejudiced in its favour. At the same time, seeing that many of them must have had a very large experience in its use, it appeared to him surprising that there should have been so little evidence of its injurious effects, if it contained materials which were capable, even in a few instances, of producing such results. He remembered well the circumstance being alluded to of these coloured rubbers containing the sulphide of mercury at the time they were introduced to the notice of the Society by Mr. Putman: and he must say that it struck him as being highly probable that there might be some such occurrence as poisoning by mercury. Although at that time he was aware of the inertness of that peculiar compound of mercury he looked rather carefully for some such conditions, and a few years after he had used it, a case presented itself in which a lady who had for some years worn a gold plate, apparently without discomfort, after wearing for some little time a vulcanite plate suffered from symptoms of salivation. The vulcanite plate, however, was in a filthy, dirty condition, and was anything but smooth. It was thoroughly cleansed, and then highly polished, and the patient was instructed to keep it perfectly clean. After that, the symptoms immediately disappeared, and she had the comfort she previously experienced in wearing the gold plate. The same thing had occurred on one or two subsequent occasions, and from the same cause. It was well

known how susceptible some persons were to the influence of mercury. Only a short time ago he had seen a person who, for a bilious attack, had taken five grains in a blue pill, was most profusely salivated. It might occasionally happen to some persons, from getting, from the porous vulcanite, some small compound of mercury, not in the form of the sulphide, and account for affections described. He thought it would be very satisfactory if the Society took the matter up in a serious form, and appointed a committee to thoroughly investigate the point. Mr. Tomes, jun., had made some most interesting remarks, shewing the results of excellent experiments by Dr. Attfield, which, on the face of them, would wholly negative the idea that good rubbers would have any such deleterious effect as that described, and he must say that the cases which had come under his own observation, and those he had received from others who had a much larger experience than himself in the use of rubber, were really so very limited and readily accounted for, that he thought the cases where symptoms of mercurial poisoning occurred from the use of vulcanite plates must certainly be most exceptional and very rare; but even if they did occur it was desirable that the Society should ascertain in what proportion they occurred, and still further, whether any condition the patient might present—in the saliva or in the condition of the patient's state of health would lead to the belief that such a person would be liable to that which was certainly a very serious occurrence, namely, salivation, or symptoms of mercurial poisoning from using such plates.

Mr. S. Hamilton Cartwright said he felt considerable diffidence in making any remarks with regard to Dr. Woodman's paper, inasmuch as he lost the very great pleasure of listening to it through an unavoidable engagement in the country. He was, however, acquainted with the tenor of it, having read a very interesting article by Dr. Woodman in one of the medical papers a short time since. The question, as Mr. Coleman had just said, was a most important one in every bearing, vulcanite now being so very largely used. Although he had had a comparatively limited experience he had seen many cases where vulcanite had been used, yet he had never seen one case in which it could clearly be proved that vulcanite was the cause of any of the abnormal conditions which had been described. Two or three cases now presented themselves to his memory. It seemed to him that there might be some three or four other factors in producing such conditions which had not been sufficiently described. First: plates of various kinds were made use of under different conditions in the mouth. Occasionally it would be found that the mouth was very ill-prepared before these appliances were adjusted. There were often loose stumps here and there all in a very unhealthy condition, and that alone might be the cause of subsequent trouble, the gums participating in the generally unhealthy condition. There was another cause, of which he had lately seen an example, and that was the force of oversuction. It happened to be a case where vulcanite was used, although he had seen the same effects produced when gold was the material employed. A lady came to see him about three weeks since, with a piece which was so well made that he told her she had no right to come to him; but it appeared that the work had been done by some provincial gentleman and she wanted present relief, which he could not refuse to afford. In this case there were all the symptoms, as far as salivation went, of mercurial poisoning. The gums were very much inflamed, and she complained of

a constant singing in her head, and was altogether in a state of discomfort; so much so, that, although the piece fitted so well—a consummation always to be most devoutly wished—still in this case she told him that directly she removed the piece she found that all these symptoms ceased. He might mention that the piece was of black vulcanite, although that was not of much consequence in his opinion. He simply relieved the pressure by the full use of a gouge, and instead of its adhering (it was in the lower jaw) as it had done before, it was simply kept in its place by clasps. He had seen her two or three times since, when she informed him that the salivation had ceased, and also the singing noise in the head, and she was relieved of her trouble, which was probably owing to over suction and consequent pressure on the superficial nerves. She now wore the same piece of vulcanite which she had before blamed. Another case came to him at the hospital, where the patient had a tooth removed. The piece was of that very red uncomfortable material, which was often seen in the shop windows of certain unqualified people who so much disgraced the dental profession. Here, again, there were all the symptoms of mercurial poisoning. There were two points to be recollected, however, in this case. This was a hospital patient and, as was well known, they were liable to diseases which he hoped the more respectable part of the community were not liable to; and secondly this piece was in a porous condition. This was at King's College Hospital. He told him to leave off using the plate, he had several teeth stopped, and after three visits made in the course of ten days, the gums were in their proper condition and as healthy as possible. He believed that was the only case in which there was anything that would lead him to suppose that these mercurial symptoms resulted from the use of vulcanite. Of course he questioned the patient whether he had taken mercury, but it is not always possible to trust the accounts of patients. Then there was another thing to be borne in mind. There were some patients who did not remove the pieces from their mouths. Mr. Coleman would recollect the case not long ago of a Greek priest who was a patient of his and who came to his hands incidentally. This patient was in the habit of never removing his piece. In his case were found many of the disagreeable symptoms described, such as a hypertrophied gum and a fetid discharge from the gums. He did not see the patient afterwards, though he took the opportunity of telling him he was not obliged to look after such cases as that. Mr. Coleman might have seen him since. If the patient in question had paid attention to the recommendations he had, his gums would, when seen again by him, have probably regained their normal condition. He should like to ask Dr. Woodman two questions: first, whether in any of the cases he had seen there was over-suction, and secondly, whether they had not occurred in patients who were in the habit of not being cleanly, or who, perhaps through ignorance, kept their pieces perpetually attached to their mouths, without ever removing them for the purpose of cleaning them. He might, perhaps, also ask him whether they were from that class of patients, who, by reason of not being very well off, had been driven into the hands of that class of men whom he had just characterised.

Mr. Vasey had much pleasure in saying that in the large number of cases he had treated with vulcanite, he had never seen any disagreeable results, except where the cases were not properly attended to. He would also remind Dr. Woodman, in reference to the one or two cases he mentioned, in which the pieces seemed to be in good condition and

fairly kept, that it was a very common practice, with those who neglected their mouths and pieces, to give them a good rub up before going to see the dentist. He should rather attribute the symptoms of the few cases which had been brought under observation, to inattention to the mouth.

Mr. SEWELL mentioned a case he had seen that week, perfectly authenticated, in which a patient was salivated by a single dose of mercury. That might, to some extent, account for the cases shewing symptoms of poisoning. He must confess that he could not trace all the symptoms Dr. Woodman had described to mercurial poisoning, more especially the eruptions, not only of the mouth, but the cheeks and the skin, which appeared to have the ordinary syphilitic character. He could not understand why the graver symptoms described by Dr. Woodman, could possibly arise from the minute doses which must have been taken in these cases. He did not understand whether Dr. Woodman had actually seen cases of paralysis traceable to this poison. It was quite evident that Dr. Woodman had seen cases where the cavities he had described in rubber were full of mercurial salts, and which might have caused the symptoms alluded to. It was not surprising if, in the London Hospital, which was situated in perhaps the poorest district in London, a dozen cases of that description had presented themselves within the last few years.

Mr. BARRETT said he should like to ask Dr. Woodman one or two questions on that interesting subject, namely, whether he had an opportunity of weighing accurately the quantity of vermilion contained in a certain number of pieces of vulcanite, because this seemed to him a very important matter. Dentists knew pretty nearly what was the average loss of vulcanite pieces. It might vary somewhat. If the quantity of vermilion contained in these pieces was ascertained, it could then be found what quantity of vermilion was taken into the system during a certain number of years, and the possibility of such an occurrence as that described by Dr. Woodman could be settled. It was an occurrence so serious, that one was at a loss to know why dentists had never met with these terrible symptoms in the many cases that had been under their notice. It was, he thought, fourteen years since vulcanite had been introduced, and during that time, no such case as that described had occurred in his practice, although vulcanite had superseded the use of almost every other material. He had certainly seen cases of irritation of the mouth produced by the wearing of artificial teeth; but if his memory served him right, these cases had been more particularly brought under his notice when gold and ivory plates were in use. It was not an uncommon thing to hear patients who at one time wore gold plates, state that they would never use them again, after they had used vulcanite. He agreed with those statements which had been made in reference to non-cleanliness of patients. There was also another point. It was well-known that vulcanite was most usefully employed in regulating plates. In regulating cases, there was unquestionably a certain amount of irritation met with around the necks of the young teeth, but this was produced mainly by pressure upon those teeth, simply from the fact that irritation was produced about those incisor teeth where the vulcanite was pressing upon them, and rarely was it found round the molar teeth. If the vermilion in the vulcanite was the source of irritation, it would of course, be found equal in all directions. As to the theoretical part

of the subject, Mr. Tomes, jun., had so exhaustively spoken upon it, that it was unnecessary for him to say anything further on that point.

Mr. Coleman thought it would be desirable if a practical character were given to the meeting, and that a committee were appointed to investigate the matter, composed of Messrs. Cartwright, Saunders, Barrett, Mr. Tomes, jun., and Mr. Turner. He mentioned the names of those three gentlemen first, because they had had such an immense experience in the use of vulcanite. He did not think that those gentlemen need be troubled further in the matter, than to give the number of cases they were acquainted with in which vulcanite had been worn, and to state whether they had seen any such conditions as those stated by Dr. Woodman. He thought the other gentlemen would naturally suggest a variety of experiments that might be made as nearly as possible resembling those in the mouth with vulcanite, and that the results should be published at a future meeting of the Society.

Mr. Dennant said he had much pleasure in seconding Mr. Coleman's proposition, and he did so because he felt sure that there was existing in the minds of certain members of the medical profession a great prejudice against this useful substance. A short time ago a gentleman came into his hands who had sustained concussion of the spine, followed by subsequent cerebral irritation. He was wearing a platinum denture, from which he suffered from a little over-suction; he also complained very much of the weight of the piece, and was suffering very much from symptoms which would have probably led Dr. Woodman to suppose that he might have been poisoned by vulcanite; but the patient came to him (Mr. Dennant) with the caution that under no circumstances whatever was he to wear vulcanite, this was strongly advised by a physician in Brighton and a physician in London. He thought it very likely that the prejudice might have arisen from imperfect specimens of vulcanite which were in use in its earliest history. In these days, however, he conceived that there was no danger at all, and in opposition to the medical request he besought him to use vulcanite, because he felt it was eminently a case in which the lighter material would be an essential advantage to him. This he did after several consultations, and he had tried it now for some eight or nine months with great relief and no injury whatever.

Mr. Weiss said he should not have spoken a second time, but he was desirous of alluding to a case he had had just the very reverse of that mentioned by Mr. Dennant. The wife of a well-known surgeon in London had a vulcanite piece constructed of black rubber, and complained of heat in the gums. He considered the complaint merely arose from fastidiousness, the teeth were kept thoroughly clean, and there was nothing in any way to account for it, still, he had her husband's testimony that as long as she wore the piece there was a continual unpleasant feeling of heat in the gum, which was never absent as long as she wore it. A piece of gold was substituted for the vulcanite, and all these symptoms subsided.

Mr. Turner said that apart from the technical matters that had been introduced as to the decomposition of this poison, he thought there were one or two circumstances which might have tended to aggravate the cases which had come under the notice of Dr. Woodman, and which he had so kindly brought before the meeting. It was most important that dentists should know the possibility of such circumstances arising, because the

fewer they were the more likely were practitioners to be taken by surprise when an isolated case presented itself, and on that ground alone, the Society was greatly indebted to Dr. Woodman for the manner in which he had brought the matter before it. In all probability, the cases which Dr. Woodman had noticed, had arisen from the inferior rubber which was so frequently in use. There was a point which ought to be borne in mind in reference to this inferior rubber. It was not only the way in which it was adulterated, or the inferior way in which it was worked up and cooked and cured by the dentist that should be taken into consideration, but also the inferior quality of vermilion which might be used as a colouring pigment. That, to his mind, might supply a source of evil which would give rise to almost any symptom that had been described by Dr. Woodman. It had been stated in the course of the evening that arsenic was frequently present in vermilion; but there were other substances which need not be mentioned, which were deliberately used for its adulteration for the sake of producing a cheap substitute. If such a character of pigment were used in connection with the rubber, it was not surprising that there should be such aggravated symptoms as Dr. Woodman had observed. Another point was, that rubber was used—as Mr. Weiss had called attention to—for blocks, by the class of practitioners likely to use inferior rubber. If it were so, and if the rubber was worn down by the trituration of the food and taken into the system, that was a question which must be considered apart from the decomposition of the mercury in the vermilion. If the vermillion contained other poisonous matters besides the mercury, there was then a source of mischief which should be enquired into, and which might produce many of the symptoms which attracted the attention of Dr. Woodman. There might, also, be one or two other points which would escape the attention of a medical man. The conditions of the mouth had been referred to. There were frequently a large number of stoppings which were sometimes very bright and glistening, but when the instrument was put upon them they were found to be very soft. Perhaps the patient in whose urine the mercury was detected, had one or two of those stoppings in his mouth which might have escaped the attention of Dr. Woodman.

The President said that in his own practice he had seen no evil result from the use of vulcanite, although he had used it freely for many years. He had a very intimate friend who, from the smallest dose of mercury, was very freely salivated. Once or twice she had been induced to take three grains of blue pill against her conviction, and each time there was profuse salivation; although she wears a vulcanite plate without any injurious effect whatever.

Dr. Woodman, in reply to the several speakers, said he must confess that even should his chemistry prove to be wrong, he should not be sorry, because he thought that some good would come out of the discussion. His chemistry was not all pure hypothesis. He had made a number of experiments and he had certainly found the presence of mercury, as he believed, although he might be wrong. The test on one or two occasions had been to produce the metal by a voltaic pile and then to dissipate the mercury again by spirit lamp. He had spoken of silvering a sovereign; when he had done so, he did not silver it all over, he simply got an unmistakeable silvery tint on the sovereign. His paper expressly stated that only in two or three cases was the mercury

found in the urine or saliva. There was considerable difficulty in making these experiments, not only in getting the patients to furnish the materials for analysis, but in analysing them afterwards. Still, he had made the experiments; and he believed if Dr. Attfield would repeat the experiment with strong enough solutions of chloride of sodium and with commercial vermilion he would find mercury in the solution, although it was possible that pure vermilion might not yield it. His chief experiments were made on vermilion derived from these plates. He believed that it was not disputed that the rubber was tinted with vermilion, and he thought he was not very far out in his proportion. He was not an analytical chymist, but he believed the rubber when vulcanised contained very nearly a third of vermilion. That was also the opinion of the American physicians. He did not say it was an easy thing to get vermillion out except by saline solutions; he had used nitro-hydro-chloric acid; the rubber seemed to be entirely dissipated after a time, and he believed there was scarcely any, if any, organic matter left. There were two or three points raised by gentlemen who had spoken, to which he thought he must allude. First, he had been asked about paralysis. Anything like absolute paralysis he had never seen: loss of power he had seen and loss of sense, but not anything like true paralysis. It must not be expected, however, that all these symptoms could be found in a single case. He had already anticipated the remarks made about want of cleanliness, and that was perhaps the case with nearly all the patients. They wore the plates for a long time, and perhaps the plate mentioned as being so well made was a well-fitting one, and there might have been over-suction. Still, the longer the plate was worn in the mouth, if the vermilion was dissolved in any way, the more likely it was to produce the symptoms. With reference to amalgams, he thought it quite possible that some of the patients might have had amalgams in the mouth, although he would not be certain about that. He had mentioned syphilis expressly in some of the cases, and it had been doubted whether some of the sores or skin diseases had not been produced by it. The characteristic eruption caused by vulcanite was very different. It was of a very bright red and continued so for a long time, while syphilitic spots came out bright red but did not last so long. The inconvenience caused by these spots was very different from that caused by syphilitic eruptions; their surface was very different from syphilitic lichen and they kept their colour for a long time. With reference to inferior vermilion, he thought it quite possible that red-oxide of mercury was used in many cases to adulterate it, although he had not gone sufficiently into the question to form a decided opinion. Whether in the subsequent processes it underwent it would remain red-oxide he could not say; he did not know whether the intense heat and so on would keep it. It was very desirable that these points should be investigated. He must confess that he believed a certain proportion of the vermilion underwent solution. He had seen that day a plate which had been worn for many years; it was quite red when it was first put into the mouth and it had become black. Although he had not made sufficient examination of it, it was certainly black, of an Ethiops mineral character, showing that some change had taken place in the mouth. Then the question as to the porous plates he had already anticipated in his paper. As to the number of his cases, there were twelve when the paper was first written, and since that time there had been three milder

cases. One of them was remarkable for having no special symptoms except that the man, who was now dead, was never well again afterwards. He had previously certain heart and kidney disease; but the curious thing was that up to the time of wearing the plate the man was well, but after that he was never well again. The man had also mental anxiety afterwards, which might have had a good deal to do with it. He (Dr. Woodman) had met two or three cases simply with a general condition of bad health and *malaise*, and other special cases where porous plates were used and where the patients were not cleanly and wore their plates at night; but it did not take away from the mercurial character. One or two mercurial symptoms should not be taken only, but they should all be taken together, and that would settle the mercurial character. He had gone into the question of cosmetics and vegetable medicines, and he had found that every medicine called vegetable was almost sure to contain mercury. It had been said that many patients were easily salivated. When he was an apprentice he got into trouble by giving a lady mercury. He was quite certain he never prescribed it; but it was found she had had a small dose of mercury in this way—two calomel pills of another patient were made upon the same slab, there were only two pills and the slab was not washed; she might have had about half-a-grain of calomel in all, but she was exceedingly susceptible. The same thing happened to the lady 25 years before from an exceedingly minute dose of mercury. Some patients were no doubt very susceptible, but it was necessary that some provision should be made to meet those cases; and he must say that even if his chemistry proved to be wrong he believed good would arise out of the discussion. He hoped the Society would give him credit for having no unworthy motives in the affair. He had come to the meeting without making any reflections whatever on the good faith of the manufacturers or users of vulcanite. He only felt it his duty to call attention to one or two points in connection with the matter.

The PRESIDENT said, that in order to shew Dr. Woodman how much the Society was indebted to him for his paper, and how much they were in earnest on the subject, he would put Mr. Coleman's motion to the meeting before they returned him (Dr. Woodman) their cordial thanks.

The following motion was then put and carried unanimously. "That a committee be appointed to investigate and report upon the question of mercurial poisoning by coloured vulcanite, as brought before the Society by Dr. Woodman, and that the committee consist of Mr. Cartwright, Mr. Saunders, Mr. Barrett, Mr. Tomes, jun., and Mr. Turner.

The PRESIDENT, addressing Dr. Woodman, said the Society had only to return him its thanks, and to express to him its deep obligation for the manner in which he had brought forward a most important subject, and for placing before the meeting, matter with which they were certainly not altogether familiar, but matter which deserved the most careful consideration, both from a professional and public point of view, and which at the hands of the committee would, he trusted, be very fully investigated.

Dr. WOODMAN, in returning thanks for the compliment, said, that if any more cases occurred to him, he would take care to bring them before the notice of the committee.

COMMEMORATION DINNER OF THE LONDON DENTAL HOSPITAL.

The Commemoration Dinner was held at "The Criterion," the chair being taken by Campbell De Morgan, Esq., F.R.S. The usual loyal toast having been warmly received—

The CHAIRMAN in proposing the toast of the evening, "Prosperity to the Dental Hospital and School," said he regarded the meeting more as a social than as a public gathering. Old friends were met to converse with one another, and some had come from long distances to show their attachment to the Hospital. It was unnecessary for him to commend the toast to them, because they were all of one opinion with regard to the Hospital. Many of them had seen the Institution in its infancy, and had watched its growth until it took possession of the new establishment in Leicester square, and left its original cradle in Soho. He himself was one of those who had some misgivings as to the entire wisdom of that change, but circumstances that had since occurred had satisfied him that although for a larger sum of money a finer building might have been secured, that advantage would hardly have been worth the additional payment, so good were the present arrangements, and looming in the future were still greater opportunities for advancing the science of Dental Surgery. Long before the public feeling was expressed as it now is, with regard to the absolute advantage of charity as connected with such institutions, he had held the opinion that although charity was an excellent thing, like everything else in this world it had its opposite side. He had no doubt that to a very great extent the large amount of charity that took place in London, did tend to the destruction of that self-reliance which was once the pride of Englishmen. A great number of persons, who formerly would have scorned to receive charitable aid, now flocked under false pretences to obtain the benefits of the hospitals. So far the charity became a source of evil. In the Dental hospital, however, there was a certain compensation to the public for any injury which might be done to individuals. The school connected with the hospital gives an opportunity to a large number of those who would otherwise be without it, to acquire knowledge which would enable them to be useful to their fellow-creatures. The object for which the hospital was founded, was to raise the profession of dentistry from the condition in which it was at one time to that in which it now was. The school was founded, and then the hospital was opened for the purpose of giving instruction to the students of that school. In this way the institution rendered compensating advantages to the public by turning out a race of men such as those whom he saw around him, who did honour to the profession at large. He therefore felt great pleasure in proposing the toast of the Dental hospital and the Dental school.—(Applause.)

The toast was cordially responded to.

Mr. THOMAS ROGERS proposed "the President of the Royal College of Surgeons of England, the Board of Dental Surgeons, and the Visitors." Whenever he had been brought into communication with the President of the College of Surgeons, or the members of the Board of Dental Surgeons, he had, he said, always met with the most kindly consideration and courtesy. Most present would remember the able manner in which one of those gentlemen, Mr. Savory, presided at the prize distribution last year, and although the President of the College was unable to attend on

that occasion, he wrote an exceedingly kind letter, expressing his regret and the interest he felt in the success of the institution. From personal acquaintance with almost every one of the examiners, he was convinced that at the examination the anxiety of the candidate was little less than that of those before whom he appeared. It was almost as great a pleasure to those gentlemen to grant the candidate the object of his desires, as it was to the candidate to receive it, and only the most acute sense of duty ever caused them to reject him. He trusted, and in fact almost believed, that in future the students at the Dental school, did not mean to give the members of the Board of Examiners the pain of rejecting them, and he was quite sure there could be no more acceptable statement to the gentlemen composing the Board.

The toast was acknowledged by

Mr. CLARK, who said that the alliance which existed between the Dental profession and the College of Surgeons was a most legitimate one, and one which all who wished well to the profession must hail with satisfaction. At the present, when there was such a prevailing tendency to split up the profession into numerous fragments, under the title of specialities—a tendency which was very much to be deplored in the interests of the science of surgery—it was a happy omen that the dental profession desired to unite themselves in general surgery, and that the College of Surgeons was desirous of accepting them. Formerly, anyone who attained a certain degree of tact in the mechanical part of dentistry, was considered competent to practise as a dental surgeon. He trusted that that time had passed, and passed for ever, and it was with great pleasure that he saw the increasing numbers of those who, while devoting themselves specially to dentistry, became also members of the College of Surgeons. The Board of Examiners were gratified by the improvement which had taken place in the examinations of those who came before them as candidates for their diploma. The standard of education for dental surgeons, was much higher now than it used to be, and he attributed this change to the careful instruction which the students received at the Dental Hospital. If he might interpret the feelings of other visitors by his own, he was sure that they were greatly pleased to see around them so many gentlemen who were feeding the specialité of the odontological profession, and who, one and all, were willing to identify themselves with the general practice of surgery.

Mr. SAUNDERS in proposing the health of the President of the Odontological Society, said he was reminded on the present occasion of the anecdote which was related of Sidney Smith. On one occasion when Lord Melbourne was telling one of his good stories with the usual complement of oaths and strong expletives, and which in those days was deemed necessary to give point and life to an anecdote, Sidney Smith who was present, said "Could not you give us the story without the 'damns,' we will take the damns for understood." So now, he, Mr. Saunders, would propose the toast with which he was entrusted without any prefatory remarks. Everyone, and the meeting knew the President of the Odontological Society as the first of living odontologists, and as the cordial supporter of any scheme which had for its object the elevation and advancement of the Dental profession. Many present also knew him as a friend, not one of the gushing sort, not even demonstrative, but honest and true, always prompt to detect and recognise the

better side of a man's nature rather than to see his weaknesses and shortcomings. Another claim which Mr. Tomes had upon them, was that he had given to the profession a son worthy of himself—on whom he had bestowed with no sparing hand the glorious inheritance of the highest educational advantages which this country afforded.

Mr. Tomes in acknowledging the toast, after thanking Mr. Saunders for the very kind way in which he had proposed it, said that the Odontological Society was the earliest association of dentists. Embodying the education, the intelligence, and the liberal feeling of the profession, i had fostered a high standard of professional conduct, and he regretted that they had occasionally to rid themselves of those who had rendered themselves ineligible as members of the Society in consequence of the selfish manner in which they had practised their profession. The Society had steadily pursued a line of conduct calculated to elevate the profession at large. He thanked the gentlemen present most heartily for the manner in which they had received the toast, and more especially for the kindly way in which Mr. Saunders's flattering reference to his son had been accepted.

Mr. Savory proposed the last toast, that of the Chairman, no one, he said, who was concerned in the great cause of professional education, could have failed to watch with interest the rise and progress of the Dental Hospital and School. He regarded its establishment as one of the wisest steps which had been taken by their joint profession in the present day. Apart from questions of charity and public benefit the great purpose of the Dental Hospital and School was the advancement of learning. While some of the older Institutions were in the throes of a very difficult parturition, which he trusted would end neither in an abortion nor in the production of a monster, it was pleasant to witness the natural birth of a new era in dental surgery. Changing the figure, he said it was not enough to get the ship afloat; a good crew was essential to a prosperous voyage, and those connected with the Hospital had shown their sagacity in nothing more than in their choice of a captain. Mr. Campbell De Morgan was not only an excellent administrator, but an admirable example to all who came within the scope of his influence. The toast having been cordially accepted—

The Chairman responded and the meeting terminated.

Mr. Narrow acted as Toast-master.

ANNUAL MEETING OF THE LONDON DENTAL HOSPITAL

The Annual General Meeting of the Governors of this institution, was held at the hospital in Leicester square, on Thursday March 11, the Hon. Arthur Kinnaird, M.P., presiding.

The hon. Secretary read the reports of the Managing Committee and the Medical Committee. The former document chronicled the inauguration of the new building in Leicester square, which was celebrated by a conversazione, and acknowledged the important services rendered by Mr. C. D. Davies and Mr. A. G. Medwin. The first public distribution of prizes to the successful students of the London School of Dental Surgery was recorded as an important event. A legacy of £300 was stated to have been received from the executors under the will of the

late Miss Ratray, and among those to whom the hospital was indebted during the past year, were Mr. and Mrs. Jones-Gibb, and the Committee of the Metropolitan Hospital Sunday Fund.

The balance sheet showed that the donations of life governors during 1875, had reached £161 15s., and the annual subscriptions amounted to £348 5s. During the past year the list of Vice-Presidents had increased by the addition of the names of the Right Hon. Earl Granville, K.G., Professor Flower, F.R.S., and W. Scovell-Savory, Esq., F.R.S. The Medical Committee congratulated the Governors on the success and well-being of the hospital during the past year.

The Hon. ARTHUR KINNAIRD, M.P., then addressed a few words of hearty and sincere congratulation on the termination of part of the labours of the committee, for the building fund was for a moment closed. The influence which the institution would have on the great four-million city would be immense. To shew the great and good benefits which the Dental Hospital was able to confer, the hon. chairman referred to his last interview with the late Lord Brougham, who took his teeth out (which, but for the dental art, would have been impossible), and said that they were often the plague of a whole life, from the day of the birth, to the day of the death of a person; and he said with thankfulness, that, but for the art, he believed he would not have attained to so great an age as he had. The hon. speaker congratulated the committee on the fact. The hospital had now a basis upon which to work for generations to come, by the establishment of a school of dental art. He congratulated the meeting on the fact that Mr. Saunders had secured the next house to the hospital, and it was likely that before long, it would be necessary to extend even further the operations of the institution. Those gentlemen who had brought the hospital to its present useful condition, he hoped might continue their labours for a long period, and receive the gratitude which was their due.

The report having been adopted, the meeting passed on to the business of the election of officers for the ensuing year and other routine affairs.

Thanks were passed to Mr. Saunders for his untiring exertions towards securing the new building. The Hon. Chairman also received the cordial thanks of the meeting.

CORRESPONDENCE.

TO THE EDITOR OF "THE MONTHLY REVIEW OF DENTAL SURGERY."

SIR,—Can you, or any of your readers, answer the following questions?

1. Is it true that *no* practitioner is to be admitted to examination for the Dental Diploma, who has used any kind of advertisement since 1859?

2. Is it true that *any* who hold the diploma, are in the habit of advertising "*painless operations*," "*prices to suit all*," &c., &c.?

3. Is it a fact that *any* Licentiates have advertised regularly for years, and still that their names appear in every published list?

4. If so, can you point out the principle upon which the Board acts, in retaining among their acknowledged alumni, those who are guilty of the very "vice" for which they take upon themselves to reject others.

An answer would greatly oblige an

INQUIRER.

February, 1875.

Answers to Correspondents.

"A Cæsarean, Jersey," declined with thanks. Not suited for our pages. Try *Figaro* or *Punch*.

APPOINTMENT.

Mr. W. E. Harding, L.D.S., has been appointed Dental Surgeon to the Salop General Infirmary.

The following Publications have been Received:—

The Dental Register.
Johnston's Dental Miscellany.
Le Progrès Dentaire.
Le Progrès Médicale.
The Dental Cosmos.
The Pennsylvania Journal of Dental Science.
The Missouri Dental Journal.
Deutsche Vierteljahrsschrift.
Transactions of the Odontological Society.
Correspondenz Blatt.
Boston Journal of Chemistry.
The Dental Advertiser.
The London Medical Record.

LONDON DENTAL HOSPITAL.

Cases treated from February 1st to February 28th, 1875.

Extractions. Children under 14	299
Adults	398
Under Nitrous Oxide	197
Gold Stoppings	169
White Foil ditto	59
Plastic ditto	175
Irregularities of the Teeth treated surgically and mechanically	53
Miscellaneous Cases	242
Advice Cases	35
Total	1627

David Hepburn, *House Surgeon.*

TO CORRESPONDENTS.

All communications intended for the Editor should be addressed to the care of Messrs. Smith, Elder & Co., 15, Waterloo Place, Pall Mall.

All inquiries respecting Advertisements and Subscriptions should be sent to Mr. George Butcher, 4, Crane Court, Fleet Street, E.C.

THE LATE MR. EDWIN SERCOMBE.

It is with very deep regret that we announce the death of Mr. Edwin Sercombe. On the 6th instant he caught cold, this was followed by inflammation of the lungs, and in eight days—that is on the 14th instant—he died. Sir William Gull, with his usual medical attendant, did all that their skill could suggest, but in the prime of life he has been removed from a sphere of usefulness, in which by his earnestness of purpose and undeviating rectitude, he had obtained the respect and regard of all who came into contact with him. With the progress of the Odontological Society, the London Dental Hospital, and the Dental Diploma movement, his name will always be identified, and in the hearts of those who knew him intimately, his memory will long be cherished.

We trust in our next issue to be able to give a more detailed account of our esteemeed colleague's career.

THE MONTHLY REVIEW
OF
DENTAL SURGERY.

No. XI. APRIL, 1875. Vol. III.

THE BRITISH DENTAL ASSOCIATION.

We have received from various quarters most satisfactory evidences of sympathy with the movement we proposed in our last issue. We are carefully collecting together those whom, we believe, the profession will accept as a provisional executive committee, so that adequate means may be taken to secure the support of the entire body of dentists who are practising their profession in a legitimate manner.

Without expressing what may be the exact laws on the subject, we may state broadly that all practitioners who advertise their professional attainments and capabilities in the public press, will be ineligible as members of the Association; and the same remark applies to those practitioners who choose to adorn their door-posts with hideous examples of dental abnormalities, or brass and zinc signs containing in the centre some choice specimen of dental manufacture. Those gentlemen, we say, will most certainly be ineligible for the membership of the British Dental Association. If they voluntarily choose to practice a profession as if it were a trade, they must not be surprised if those who practice in a professional spirit hold aloof from them. The former class have the pecuniary advantage

which their trade customs confer, and with this—since they have so elected—they must be content.

To those, however, in all parts of the country, who are striving honestly to conduct their professional work in a proper spirit of self-respect, and regard for their position as allied practitioners to the great body of medical men, the Association will offer and confer the greatest possible advantages; since the election of some and rejection of others in the various towns of the provinces will afford a ready means whereby the public may know who are deemed fit and proper persons to be recognized as true dentists; we say "true" dentists advisedly, for in the absence of any prohibitory legislation there is nothing to prevent the tinker of to-day becoming the dentist of to-morrow, and if he be only possessed of sufficient impudence, it may be safely predicted that he will attain to a sufficient degree of success to injure the honourable practitioner, who, with high-class skill but some modesty, declines to put himself in competition with a man that he utterly despises. Yet what can he do? if he tell the truth as to the origin of his "brother practitioner," it is put down to jealousy or fear of a rival; if he be silent, he has very often the satisfaction of knowing that he is starving on respectability, whilst the man who wilfully advertises that which is untrue, and vulgarly obtrudes his calling upon the public by means of handbills and show-cases, grows rich through the credulity of a public that still insist on believing in the pretender with the loudest voice and fewest scruples.

In thus helping the dental practitioners throughout the country in the maintenance of their professional and social position, by affording clear testimony as to whom their brethren deem worthy of recognition, the British Dental Association will accomplish an amount of reform that has hitherto been unattainable by any existing organization.

THE MONTH.

Peacock *v.* Harrison.

A case of considerable local, if not general interest, was tried at the Scarborough Court of Record, on the 13th inst.

Mr. Peacock claimed £4 4s. for four and a half hours time devoted to a patient; the defendant resisted the claim on the grounds that the work done did not correspond with the amount of time expended. Without entering into all the particulars (which will be found in the *York Herald* of the 14th inst.), this was clearly the main point at issue.

Mr. Peacock charges by time, and the patient was brought to him with a full knowledge of the method by which Mr. Peacock makes his charges, if that gentleman found it necessary to devote four hours and a half to the preparation and plugging of one tooth in gold, and the preparation of another tooth in which there was an exposed and dead pulp, the patient should only regret that by the previous neglect of the teeth she had rendered such elaborate operations necessary. Mr. Peacock is well-known to his professional brethren and a large circle of friends, as a just and conscientious operator, and the suggestion thrown out in the course of the trial that payment by time offered a premium to laziness on the part of the operator, was an ungracious remark by one professional man in reference to the conduct of another.

Mr. Peacock, after showing more than ordinary forbearance, brought the present case forward for trial, and in the verdict he obtained, he may be congratulated on having fully vindicated his position as an honourable man, and his thoroughly professional method of conducting his practice.

London Dental Hospital.

Mr. Merson has been elected House Surgeon to the London Dental Hospital in place of Mr. David Hepburn, whose term of office has expired. We are glad to learn that Mr. Hepburn's services are appreciated so highly by the students that shortly a testimonial will be presented to him.

Whilst we fully agree with those gentlemen who deem Mr. Hepburn worthy of this special mark of their regard and esteem, we would point out that it may place future students and House Surgeons of the Hospital in a somewhat painful position, since the students on another occasion may be called upon to continue a custom thus established and yet feel that they have no sympathy in the movement.

Hutchinson on Imperfect Teeth and Zonular Cataract.

At another part of the *Review* we reprint from the *British Medical Journal* and *Lancet* a valuable paper and discussion on the connection between zonular cataract and imperfect teeth.

Nickold's Gold Foil and Pellets.

We have received specimens of Mr. Nickold's various preparations of gold, and both from personal experience and the reports of other practitioners, we can fully endorse the statement of the manufacturer, "that combined with considerable cohesive property they possess in a most marked degree the softness of unannealled foils." We can confidently recommend these foils and pellets to the notice of the profession.

NOTE ON THE STRUCTURE OF DENTINE.

By CHARLES S. TOMES, M.A.

"SCIENTIFIC controversy is not worth the paper it is written on," once wrote Professor Huxley; doctrines which most approach to the truth can hold their own, and I should not have put pen to paper, had Mr. Barkas confined himself to his own opinions, at such length and with such confidence as might seem fitting to him. But mis-representation of the opinion of authorities is quite another matter, and cannot be passed over in silence. Let us take an example. In the March number, page 448, Mr. Barkas writes—"So far as my knowledge goes, no other microscopist has supported him, at least, not in books." But Waldeyer, in Stricker's histology, writes—"Tomes, by demonstrating the dental fibres, first opened the way to a correct interpretation of the nature of the dentine." (Syd. soc. translation, p. 492.) Frey (Manual of Histology, translated by C. E. Barker, p. 264) writes—"Tomes' discoveries, confirmed by the observation of Beale, Kölliker, Neumann, Frey, Waldeyer, Hertz and Boll, showed the erroneousness of this older view."

Kölliker tells us—"After Tomes had described a soft fibre in each tubule, I fell into the mistake of thinking that these fibres and the tubes represented by me, were one and the same," &c.

Dr. Lionel Beale (Structure, Growth and Life, p. 154, and words to the same effect used by him in many other passages) writes—"I have been able to verify Mr. Tomes' statements, as to the dentine tubes being occupied with this soft structure, and now pass round a preparation in which this material has been coloured red with carmine, and is most clearly demonstrated. The dentinal tubes are not tubes, nor are they canals for the transmission of nutrient substances dissolved in fluid, but they contain a soft solid substance."

So much for Mr. Barkas' statement, that my father's views are supported by "no other microscopists, at least, not in books." Now, to go on with Mr. Barkas' sentence. "In fact, Professor Owen, undoubtedly our greatest odontologist, in his 'Comparative Anatomy and Physiology of Vertebrates' (1868), completely ignores the fibre theory, and retains his original statement."

To those familiar with the works of the author cited, this needs no comment to others it need only be said that this is not by any means the only instance of Professor Owen's completely ignoring papers which conflict with or disprove his own views.

To return to Mr. Barkas. "Mr. Salter in his new work, 'Dental Pathology and Surgery,' also distinctly repudiates it; the reviewer of the last edition of Mr. Tomes' Dental Surgery, who wrote in the *Monthly Review of Dental Surgery*, for August, 1873, is equally opposed to the theory." A little care would have told him that Mr. Salter and the "reviewer" are one and the same person; he can, however, be excused for overlooking Mr. Salter's very long delayed signature to his review. As my father and I myself (to the extent of declining to review Mr. Salter's work when placed in my hands for the purpose) have, and always shall, decline to enter a controversy inaugurated in the semblance of a personal attack, I will do no more than reduce Mr. Barkas' two "authorities" to one. To return to our text. "Nor are these the only opponents that Mr. Tomes has to contend against, for we have had great comparative anatomists, as Leeuwenoek, Purkinjé, Müller, Retzius, Schwann, Lent, Kölliker, Henle, Huxley, &c., &c., (query, who are the &c., &c.?) all arriving at the conclusion, from their individual reseaches, that the dentinal tubules are only filled with fluid during life."

Let us look a little closely into this list of names. How completely Mr. Barkas has misrepresented Kölliker, to the extent of quoting him upon the opposite side to that which he advocates, the extract I have given above demonstrates. Mr. Huxley tells me he has neither written upon, nor looked into the matter for years prior to my father's discovery.

None of the other writers quoted have committed themselves to any opinion since the publication of my father's researches. What is to be said to a writer who quotes the names of every author who wrote before the date of any discovery, as furnishing a weight of authority against its truth?

Most scientific men, before writing upon a subject, acquaint themselves with its literature, but not many months back (*Monthly Review of Dental Surgery*, December, p. 303) Mr. Barkas naively tells us that he "cannot find any

mention of them in Mr. Tomes' work, which is the latest book on the subject I have read."

Now as some of the things which he proceeds to describe as new are mentioned in the last edition of "Dental Surgery," one cannot resist the conclusion (confirmed by many points in his later papers) that he has only read the first edition. That is to say, Mr. Barkas comes before the public as a histologist, prepared to settle in the most didactic manner every moot point which has puzzled one after another of the most careful investigators, without having read anything upon the subject which has been written within the last sixteen years! Or, if he has read the last edition, how can he have overlooked (to the extent of saying that none such exist) the numerous and definite references there given to contemporary authors who support my father's views? As a scientific writer, pretending to scientific accuracy, either horn of the dilemma will prove sufficiently uncomfortable; I leave him to choose betwixt them. But it certainly does not tend to inspire confidence in the accuracy of his own researches to find that his quotations of the opinions of other people are so singularly unreliable.

A BRITISH DENTAL ASSOCIATION.

By VIGILANS.

Whether the idea sketched out in the leading article in this month's number of the *Review* become "an accomplished fact ere the end of summer" or not, the projected Association seems to embody an idea to which sooner or later effect must be given. The form in which the idea has been put forward, meets so thoroughly the necessities of the case, that no one who has had any desire to take some active part in the work of promoting the interests of his profession and has hitherto been feeling the great drawback of isolation, but will consider seriously, if not favourably the question of a British Dental Association.

The opportunities at present in existence for professional intercourse can hardly be said to be sufficient. The Odontological society, although designed as its name implies to meet the wants of dentists throughout the country, yet from having its centre in London is practically a local institution. Its provincial members must either rest content with their copy of its *Transactions*, or avail themselves of

their opportunity at a sacrifice of time and means by far too great to be entertained.

To those further north, there is the Odonto-Chirurgical society—a society whose very existence is a powerful argument in favour of the professional zeal of provincial men, since it has no fixed centre, and in oscillating between the historic and commercial capitals of the north, the earnestness of its members is tested by a journey—for every one of them of from about fifty to two hundred miles—two or three times a year, in order to be present and take part in its proceedings. Here again, however, only a part is provided for, and yet in these two instances we have exhausted the chances of friendly and direct professional intercourse offered to the British dentist.

The wish for further opportunities has found vent in the proposal to establish local societies throughout the country. To the establishment of such societies there is no objection to be offered. If practitioners over a given area wish for the opportunity of ventilating their views, and of becoming acquainted with their neighbours through the instrumentality of such societies, very much good may be expected to result therefrom, both to the Members themselves and in a secondary way to the profession. The usefulness, however, of all such societies having a fixed centre and drawing their membership from a limited area, can only be in proportion to the extent of area the membership represents, and therein lies their weak point. For all purposes of scientific research and discussion such societies may be ample and well suited, but as representing the profession as a whole, there is not much to choose between its present position and such an increase in the size, so to speak, of the units of which the profession is made up. It must be remembered too, that the usefulness of such societies would be considerably impaired by the impossibility of many members giving more than an occasional attendance because of the time consumed in reaching and returning from the place of meeting; whereas their success would chiefly depend on the spirit and regularity with which the attendance was maintained.

Few, therefore, will be disposed to regard the proposed British Dental Association as interfering in any way with, or intruding on, the province of any existing organisation. It beginning just where our existing societies leave off,

its work would be a *continuance* of theirs, and so impart both strength and support to them. Very much would certainly depend upon the course pursued by the provisional committee: on their judgment and discretion with a sufficient amount of liberality to make the movement worthy of its name, the success of the scheme would in great measure depend. Good men, however, and competent for such a work are not wanting in the profession for such an undertaking; let them have but a fair indication of the measure of support they may rely upon, and we may hope for the establishment ere long of an association, which without making any undue claims upon the time and attention of any, would place all of its members upon an equal footing. An association competent for the gathering together and utilising of all that is worthy and desirable in the profession, deriving its existence from no mere section or district, but as national in character as it should be in aim.

ON THE

MICROSCOPICAL STRUCTURE OF FOSSIL TEETH

FROM THE NORTHUMBERLAND TRUE COAL MEASURES.

By W. J. BARKAS, M.R.C.S.E., L.R.C.P. London.

CHAPTER XV.

[*Continued from p.* 408.]

GENUS. CYCLOPTYCHIUS (HUXLEY).

This genus was founded by Professor Huxley upon some specimens of perfect fishes that were discovered in the North Staffordshire Coal Measures. There is, as yet, only one species of this genus known, C. carbonarius, and it is obtained solely from the True Coal Measures; its period of existence must, therefore, have been, speaking comparatively, very short indeed. Besides its short life period, it appears to have been purely a local fish, its geographical range being very small, for according to our present knowledge, Cycloptychius roamed only in those shallow Carboniferous seas, over the dried up remains of which are now situated the Counties of Staffordshire and Northumberland. Though the remains of this fish are found in the Coal Measure shales of both these counties,

they are much more common, and more perfect in those of Staffordshire than in those of Northumberland, in fact, in the latter county they are very rare indeed, and also extremely fragmentary, only single scales having been discovered. The teeth or jaws have never been found in the Measures that I have proposed in these papers to confine myself to, but I have judged it advisable to describe them here, because it is certain that if the scales are found, that other remains of the fish that possessed these scales must also be present, and it is probable that these deficient parts will be discovered sooner or later.* For the purposes of this paper I have had to examine the teeth and jaws of fishes from the Staffordshire Coal Measures, and this I have been enabled to do through the kindness of Mr. J. Ward, of Longton, who has supplied me with specimens from his splendid collection, probably the finest collection of Coal Measure fishes in England, and it was from perfect specimens in this gentleman's cabinet that Professor Huxley founded this genus. Professor Traquair, after a close examination of the specimens of this genus in Mr. Ward's possession, published a paper in the *Geological Magazine* for 1874, in which he ably described the external characters of this fish. According to that author, this fish presents the characters which I now give in a very brief manner: it varies in length from three-and-a-half to seven inches; greatest depth is at the shoulders, from thence the body tapers towards the tail; the pectoral and ventral fins are non-lobate and small; the dorsal fin is moderate in size, and placed opposite the anal fin, which is also moderate in its dimensions; fulcral scales are arranged along the anterior margins of the fins; tail heterocercal, but not very inequilobate; head bones correspond to those of Palæoniscus, their external surfaces are finely tuberculated, the tubercles being sometimes confluent and forming short ridges; muzzle projects and is bluntly pointed; the orbit is placed far forwards and is surrounded by a chain of ossicles, a prominent one forming the inferior and the greater portion of the posterior orbital margin, in this respect resembling the orbit of Palæoniscus; possesses a

I have since learnt that Mr. Simms, of Cramlington, has in his possession a complete fish from the Northumberland Coal Measures, therefore this conjecture has been verified.

preoperculum, but no interoperculum has been detected as yet; branchiostegal rays, many and enamelled; maxilla formed of one bone; teeth are arranged in two rows, an external one of minute teeth, and an internal one of larger or laniary teeth; scales rhomboidal, and they conform, both in form and in their mode of arrangement upon the body, to the type of Palæoniscus; no trace of an endo-skeleton. These external characters clearly point out the close similarity of this genus to Palæoniscus, and it is evident that it possesses all the characters required to enable us to classify it among the Lepidosteidæ but one, and that is the absence of the interoperculum; further researches, however, may yet bring that bone to light. The scales of this fish are marked by cycloidal striations and, according to Professor Traquair, they are rhomboidal in form, but Mr. Barkas in his "Coal Measure Palæontology," states that they are cycloidal. As the first named gentleman has probably had the opportunity of examining specimens that have been discovered since Mr. Barkas' book appeared, it is likely that his statement is the correct one, but it is very difficult sometimes to say whether a scale is rhomboidal or cycloidal.

The jaws consist of a superior maxilla and a mandible, they are very well pourtrayed in Figs. LXVIII. and LXIX.;* in these specimens, however, the alveolar borders have been a little bent, near the anterior extremity, during fossilization; in their original condition these margins would be perfectly straight. Both of these jaws conform to the jaws of Palæoniscus in their contour, as may be seen by comparing the above figures with the drawings of the superior maxilla and mandible of that fish given in the November number of the *Review*. The maxilla is formed of one bone, there not being any premaxilla, apparently, in any of the specimens that have been examined, in fact I am almost convinced that the Lepidosteidæ I have described in these papers have not any pre-maxilla at all, especially when I remember that some hundreds of specimens of Palæoniscus, Pygopterus, Acrolepis, Gyrolepis, and Cyclopty chius, many of them perfect to all appearance, have been discovered and minutely examined without finding any trace of a premaxilla, and that the *only* specimen that was

* The illustrations referred to in this paper appeared in the "*Review*" for February.

supposed to shew a premaxilla was a *broken* fragment of a superior maxilla of Pygopterus which was described by Agassiz in the second volume of his "Poissons Fossiles."* The external surfaces of the superior maxilla and mandible are enamelled and marked with "interrupted longitudinal ridges, which present a slightly wavy appearance in their course." The teeth are arranged along the alveolar border according to the method I have alluded to while describing the general characters of this fish; they are small, conical, and sharp pointed, with the apex slightly curved inwards; the height of the laniary teeth averages about one twenty-fourth of an inch, and crowning each tooth, both large and small, is a sharp point of glistening enamel. A vertical section of a portion of a superior maxilla, with a tooth in *situ*, is given in Fig. LXX., magnified 200 diameters. There is not any necessity to enter at any length into the microscopical structure of this tooth, for it resembles that of a tooth of Palæoniscus. In Fig. LXX. the tooth is cut so as to exhibit its curvature perfectly, the enamel tip is intact, and the pulp cavity conforms to the shape of the body of the tooth, and is continuous with the vascular canals of the bone tissue. The calcigerous tubules of the dentine and enamel resemble those of the teeth of Palæoniscus in every respect, even to the size of their diameters. No layer of enamel is visible upon the body of any of the teeth I have examined under the microscope. The tissue of the jaw is apparently homogeneous, and numerous vascular canals ramify through it; I have not been able to detect any lacunæ, but in this respect the dental osseous tissue of Cycloptychius will probably vary, as I pointed out to be the case in the jaws of Palæoniscus, some possessing lacunæ and others not.

* Mr. Ward has since informed me that he possesses a specimen of Pygopterus in which the premaxilla can be observed, but I have not seen the fossil, I shall, therefore, suspend my judgment until I have had the opportunity of examining it or the engraving of it which I learn will be published shortly.

"THE GERMAN QUARTERLY JOURNAL OF DENTAL SCIENCE," for JANUARY, 1875.

ANALECTS BY GEORGE HENRY, L.D.S.

THIS part commences the fifteenth volume of the above Journal, and whilst evidencing the individual energy and zeal of its able editor, Dr. Robert Baume, of Berlin, shows also that he is supported by an able staff of contributors. Sixty-four pages are devoted to original communications as follows:—

(1) On retarded dentition, by Dr. Sigmund, of Basle; (2) Common appearances in dentine, by Dr. R. Baume; (3) Retained milk-teeth, by Herr Detzner, of Speyer; (4) Tooth-ache in consequence of secondary dentine in the pulp, &c., by M. Schlenker, of St. Gallen; (5) On dental fistulas; a case from practice by Dr. R. Baume; (6) On arsenic-paste, more particularly the Anderson-paste, by Herr Humm; (7) A new tooth-regulating machine, by Dr. Potpeschnigg, of Marburg; (8) On the whale-bone rubber, by Herr Kleinmann, of Flensburg; (9) On the treatment of exposed pulps, by A. J. Woodhouse, with remarks by Dr. G. V. Langsdorff; (10) On dental schools in France, by Herr Schneider; (11) Remarks on the Nitrous Oxide and the deaths attributed to it, by Dr. Schneider, of Würzburg; (12) Salicyl acid, and its use in dental practice, by Dr. Leopold Ostermann.

The rest of the Journal consists of reports of societies; selections from foreign Dental journals; a notice of the long-expected "Pocket Formulary for Dentists," by Herr Fried. Kleinmann, which is well spoken of; and the contents conclude with a programme of the first Vienna Dental school.

We give a few analects from some of the above papers under their respective numbers.

(1) Dr. Sigmund's paper deals chiefly with abnormally late dentition; late in comparison with the development of the rest of the body. He cites many interesting cases of protracted and irregular dentition, and endeavours to trace the phenomena to hereditary and constitutional causes; or, in healthy children, to the effects of certain diseases, bad living, and vitiated air. Dr. Sigmund concludes by remarking, that when children are otherwise healthy and strong, parents should be warned against the

use of medicaments to hasten dentition, as the attempt thus to force nature may be fraught with more harm than good. A more active impulse to the gums and their contents is best induced by a more substantial diet than mere milk-food, and is the only dietetic means to be tried. If on the other hand we find specific causes, which may be regarded as hindrances, or to which we may at least attribute injurious influence, our efforts should be to arrest these as soon as possible: and with regard to general affections, such as anæmia, scrofula or rachitis, the parents should be referred to a medical man for regular methodical treatment —due regard being had to regularity of diet and mode of living.

(2) This is the last of a series of six papers, by Dr. Robert Baume, which have appeared at intervals since the first in April, 1873. The author draws attention to the three recognised stages of dental caries, in the first of which we have an increased transparency; in the second, a clouding of the dentine, with the chain-like rows of globular bodies seen microscopically and supposed to be fat globules; and in the third, a varicosed condition of the tubuli with coloration of the dentine. The advanced softening of the dentine is also erroneously attributed to this stage, whereas its limitation from the appearances in the third stage is not difficult to determine. Dr. Baume then endeavours to prove (1) That the appearances enumerated are not confined to caries, but are met with in all diseases of the dentine; (2) That these appearances are alike in every respect, in the most diverse diseases from opposite causes; (3) That consequently we have general appearances to deal with, and not specific appearances peculiar to caries.

Dr. Baume denies that there are any specific carious appearances up to a certain point, and this is the far advanced softening met with in the acute form of caries. Appearances peculiar to caries are first found in this consistency of the tissue, which may be described as a fourth stage.

It is further shown, that the dentinal fibrils in transparent dentine, shrivel and even disappear beyond recognition; that the fibrils cannot consequently be isolated in the second and third stages of caries; and that the globular bodies in the tubuli, instead of being fat globules from the supposed degeneration of the fibrils, are really air spaces.

Lastly, fungous organisms are neither present nor necessary to the originating of the varicosed dilation of the dentinal tubuli, but the varicosed condition of the dentinal sheath is first caused by a chemical change in the intervening substance.

To be duly appreciated these papers must be studied in their pathological and histological bearings. It has only been possible here to give a sketch of the author's aim.

(5) This second contribution by Dr. Baume, gives the history of a remarkable case of fracture of the condyloid process, with all its evil consequences, occurring in the extraction of a tooth.

The patient, a man aged 38, had the right lower second molar extracted by a barber on the 24th November, 1873. He was perfectly well, and had ailed nothing since a slight gonorrhœa in his 21st year. The tooth came out entire, but the patient was conscious of a cracking at the time of the operation. The day after—anxious about the swollen state of his face—he went to a medical officer in the place, who treated him for erysipelas. On the 28th, four days after the extraction, he felt the presence of matter in the temporal fossa, upon which poultices were ordered. Twelve days after this a slight incision was made, and fourteen days later the opening was enlarged, and the gum lanced, this being the first time the mouth had been examined—four weeks after the extraction; nor did this surgeon examine the mouth again.

Towards the middle of January, the left side of the face became involved, the patient—much reduced—took to his bed, and entrusted his case to a homœopathic surgeon, who also continued the poulticing, but gave him medicine, and urged him to cleanse his mouth well with hypermanganate of potash. Abscesses appeared on the neck and breast, which, after tedious waiting, were opened; and, after lancing the gum, a small sequestrum was removed from the alveolar ridge, near the bicuspids, but with no benefit.

On the 20th April, he came under the care of Dr. Baume, having five fistulous openings. The face was extensively swollen, particularly on the right side. Passing down each side of the neck were dense semi-cartilaginous fistulous bands, the one on the right side, passing between the portions of the sterno-cleido mastoideus, to the upper part of the clavicle, where it divided into two cords, which opened

close under the clavicle. There was a third fistulous opening under the angle of the jaw, and a fourth under the chin. Behind the neck another fistulous band passed down towards the upper part of the clavicle. The three openings on the breast presented the character of erethitic ulcers.

The mouth could be opened but slightly, and a careful examination did not disclose a fracture, as suspected by the patient. There was crepitation, but this was attributed to the friction of pieces of necrosed bone. The whole facial surface of the right, and half of that of the left side, were necrosed. The matter had burrowed all round this surface, and was discharged by the five openings, before described.

The cause of mischief was by no means clear. Dr. Baume first sought to cut off the further passage of matter from near its source by incising the undermined gum from the bicuspids of the right side to those of the left, which enabled him to remove fourteen pieces of bone. The roots of the teeth were all laid bare to their apices, the entire wall having been lost by necrosis. This wound healed up in a fortnight. The fistulous opening under the chin healed in a few days; also that on the left side of the neck, the cord having been slit up from the clavicle to the angle of the jaw, and treated with nitrate of silver. The swelling was partially reduced by painting with iodine. Dr. Baume then treated the fistulous cord on the right side in the same manner, which facilitated probing; and as anticipated, there was a large necrosis in the neighbourhood of the right molars, but little looseness of the bone could be detected. Three more pieces of bone were removed after an incision over the part. The suppuration abated considerably. The erethitic looking openings were touched with *arg. nit.* and dressed with zinc ointment.

The patient rallied wonderfully, and was now able to attend to business. The quantity of matter suppurated seemed to be governed by the weather, for on fine days scarcely a drop came away, whereas in wet weather the discharge was considerable. The presence of more necrosed bone was suspected, and an external incision made through which a small sequestrum was removed; still the suppuration did not cease, and a second incision was made with no result.

In July, Dr. Baume advised a final operation under

chloroform at the hospital. This the patient submitted to about six weeks after, when two large pieces of bone were removed through a large incision. These proved to be the ascending ramus and the condyloid process, from which the capitulum was distinctly isolated.

Within a month after this operation the patient was completely cured.

(10) This is a translation from the French Dental Journal, *l'Art Dentaire*, for August, 1874, of a paper entitled "A Propos des créations des nouvelles Facultés," in which the absence of any Dental Faculty, or chair of Dental Surgery, or indeed any school in which pupils can acquire a knowledge of the Dental profession in France, is sorely lamented. Humbling comparisons between the professional life and activity of America, England, Germany, and even Spain, and the astounding apathy amongst the members of our speciality in France are said to have hitherto availed nothing. Let us hope that some energetic pioneer will ere long rally his confréres from this *vis inertia*, and united effort cannot fail soon to raise Dental education in France to its just and proper level.

(11) Dr. Schneider opens this paper with critical remarks on experiments published by Dr. Ostermann, in the October part of the Journal, giving contrary results to experiments of his own, which he attributes to defects in the method of procedure. Dr. Ostermann found that small animals such as canaries, pigeons, and mice, placed in a current of Nitrous Oxide, under a glass bell, ceased to breathe in the shortest case in 54 minutes, and in the longest 75 minutes; whereas in Dr. Schneider's experiments, mice, puppies, cats, and canaries, did not live longer than six minutes in pure gas, and Dr. Colton in his published experiments gives a still shorter time, as seen in the following table:—

A Mouse	...	...	from 30 to 60 seconds.
A Pigeon	...	...	1 — 2 minutes.
A Cat	...	...	1 — 2 „
A Frog	...	...	30 — 60 „

In accounting for the above discrepancy, Dr. Schneider remarks:—The Nitrous Oxide is specifically heavier than atmospheric air; he, therefore, conducted the gas by gentle pressure through a tube in the roof of the glass bell; the animal is placed upon a board within the bell, this stands

in water, and the exit tube being a little above the base, the air within the bell at starting is sure to be expelled and an atmosphere of pure gas secured, which did not appear to be the case in Dr. Ostermann's experiments.

The author appends an account of the five known cases of death in connection with the Nitrous Oxide, and considers—in conclusion—it must be acknowledged, that no individual death could be fairly attributed to the gas *per se*, and therefore it was right to assert that the Nitrous Oxide is the safest anæsthetic known. We must not, however under any circumstances give way to a careless use of it, as appeared to be too much the case in America, and we should be specially on our guard against blood coagula, splinters of teeth and defective mouth props, as the likeliest causes of danger.

Heart and lung disease, general plethoria, old age and early youth (under 6 years) contra-indicate the use of Nitrous Oxide.

AN INAUGURAL ADDRESS.

Delivered by JOHN TOMES, Esq., F.R.S.

At the Odontological Society.

(Reprinted from the Transactions.)

GENTLEMEN,—I give you my sincere thanks for your kind and cordial reception on this the second occasion of my accepting at the hands of the Society the distinguished office of President. The desire to secure the esteem and respect of our fellow-men, and especially of those engaged in like pursuits to ourselves, who, of all others, are best qualified to form a just estimate of our worth, is an object of justifiable ambition; and the warmth of your welcome leaves me reason to think that I have not wholly failed in gaining the good opinion of my professional brethren, and in rendering some service to my profession.

In seeking a President from amongst those who have already passed the chair, and who were active agents in the formation of the Society, you have shown an interest in the past, in the early days of the society, and a desire, perhaps, that a trace of the same energy and wisdom which laid the foundations, and carried on their way our prosperous society, school, and hospital, should be reproduced. If such be the case, I may thank you; but I cannot con-

gratulate you upon the selection of an agent; and my doubts increase whenever I think of the cost at which the choice has been made. Mr. Vasey and Mr. Coleman, your vice-presidents, for what they thought to be the good of the society, urged upon me the acceptance of an office which they would have in succession filled, and filled, as I believe, far better than myself. They have, with that generosity and self-sacrifice, their capability of which we had had already quite sufficient proof (and we needed no further proof), postponed, perhaps abandoned—for the future is not ours—the highest and most distinguished position which we, in our collective capacity, can bestow upon an individual member of our brotherhood; and the fact they have insisted on giving place to another is in itself a sufficient proof that they are singularly well fitted for the office of president, and, in my opinion, should, in the interests of the society, have taken it. However, you and they have willed it otherwise, and I will do my best to discharge the duties of the office which I have, not without misgivings, on personal as well as on general grounds, accepted. But if I am unable to attend all the meetings, I must ask for your indulgence, and beg that you will regard my absence as a forced and not a willing absence.

You have taken me from amongst the past presidents, and you may reasonably expect me on this occasion to recur to the deeds of the past. But it is not desirable that I should do so otherwise than very briefly, for our history is in good hands, and we may ere long expect to see a careful statement of all the historical facts that are worth preservation. For sufficiently obvious reason I shall avoid the use of the names of living men, with two or three exceptions, and those will be the names of friends who are not practitioners in our branch of surgery, but who have, nevertheless, laid us under considerable obligations.

To begin, then, the first attempt at a combination of dental practitioners with which I am acquainted took place in 1843. Minutes of the proceedings of the several meetings are preserved in the handwriting of one whose loss we have all deplored, and whose place in the minds of many of us remains, and must ever remain, a void—Arnold Rogers, our third president. There arose amongst those who met together a difference of opinion as to practitioners

who were members of the College of Surgeons acting with those who were not; and although addresses were sent to Sir James Graham, who was then in office, and to the President of the College of Surgeons, by those who held the more liberal views of association, amidst this difference of opinion the attempt at professional organization altogether failed, and but for the preservation of the minutes, very little would now be known of what really took place. Although present at the meetings myself, and engaged in drawing up one of the memorials, my memory served me but poorly till refreshed by the minutes taken by my old and well-esteemed friend, and but lately placed in my hands.

A cause abandoned as hopeless is soon altogether forgotten, or at best becomes latent, and is capable of again coming into active operation only under a combination of circumstances different to those in the presence of which it fell into discredit.

In 1855, when many of those who were engaged in the earlier movement had passed away, and time had blunted the recollection of much that happened in the minds of those who survived, such a combination of circumstances presented itself. A very influential member of the medical profession and of the Council of the College of Surgeons, after a careful and prolonged consideration of the subject, undertook, upon professional and public grounds, to advocate the formation of, I may now say, the Dental department of the College of Surgeons, and he did so with a full knowledge of the difficulty of the task, and that a considerable time must elapse before it could be brought to a successful conclusion. It was thought desirable that the movement should be commenced by the presentation of a suggestive memorial, signed by a few of the more eminent dental practitioners. A memorial of this character, known afterwards as "The Memorial," was presented by Mr. Arnott, and the attention of the college was engaged by the earnestness and strength of the arguments which he adduced in its favour. A committee, consisting of Mr. Green, Mr. Lawrence, and Mr. Arnott, was appointed to consider the prayer of the memorial.

The legal adviser of the college was consulted as to its powers in respect to organizing a dental department, and he gave it as his opinion that power must first be obtained

from the Crown in a charter somewhat similar to the midwifery charter. This was the first of the many difficulties we had to overcome. Up to this time no meeting of dental practitioners had been held, the signatures to the memorial to the college having been gained by personal solicitation. The ball had been set rolling by a moderate force, and in a direction in which it was believed possible to make it roll onwards, if the strength of numbers could now be obtained to assist in pressing it towards the desired gaol. With this in view, the memorialists, from time to time in varying strength, met and proceeded to form a society, the council of which undertook not only the duties of conducting a learned society, but also in some sort those that pertain to a representative body, for the purpose of advocating systematic dental education as a branch of surgery in connection with the College of Surgeons. It takes but a few minutes to tell of the accomplished fact; but many meetings of few and many members, held at our own houses, and often extended into the small hours, were required before the organization of the society was completed. Many of us were unaccustomed to combined action; indeed, the dentist, from a professional point of view, was then, in numerous instances, a solitary being, having scarcely a professional acquaintance. But he is not therefore destitute of fixed opinions upon professional subjects. And it needed the exercise of self-sacrifice in abandoning long-cherished notions, and of toleration in accepting views not our own, before we got into working order. There are those present this evening who will remember how frequently they were interrupted in their daily professional work by the demands of the new society, or by the importunities of its more zealous supporters. The results show that the various steps taken, directly and indirectly, in the formation of the society were calculated to command success. But there were many practitioners who from the first quite disapproved of our proceedings, and with true English vigour set about the establishment of a rival scheme,—the College of Dentists, a body designedly independent of all other medical institutions. This was for a while worked with great energy, struggling towards the same ends as ourselves, but by different ways. Finding, however, after a time, that the weight of opinion lay on our side, and recognizing the fact that the two

schemes could not prosper, the members of the College of Dentists joined the Odontological Society, and generously and heartily adopting our views, and throwing all the weight of their influence towards the fulfilment of our cause, were henceforward in no way distinguishable from the original members of this society. I shall not stand alone in the opinion that the union thus happily brought about was a subject of very sincere pleasure to all who were actively striving to benefit the dental profession. But I am losing the order in which the several leading events in our history occurred.

Before the union of the two parties, the bill which brought into existence the Medical Council passed the legislature. The College of Surgeons, struggling hard with the other medical corporations, and with medical reformers, to preserve what it believed to be its rights, did not venture to insert a dental clause in the bill then before parliament, but made it known to us that the college was quite willing one should be introduced. After several troublesome misadventures, a clause was introduced empowering the college to obtain from the Crown the Dental Charter now in operation, by Mr. Alexander Beresford Hope. I am glad of the opportunity of making this statement, for there are few of the younger members of the profession who are aware how much they are indebted to that distinguished statesman for the great educational advantages they now enjoy. Our school, hospital, museum, and library, taken as a whole, has not an equal in Europe, and even in America it is not surpassed, perhaps, collectively, not equalled; and, but for the dental clause in the Medical Bill of 1857, it might not, probably would not, in its present relations at all events, have come into existence.

The power to obtain a charter being granted, all difficulty seemed at an end; the way seemed quite clear. But it was not so; for on the college making application to the crown, the subject was referred by the government authorities to the Medical Council. That body, without the power, or perhaps the will, to negative the charter, insisted upon the introduction of a clause denying our right to register under the Medical Acts. We insisted upon the justice of a registration of those who had passed a recognized examination as licentiates in dental surgery, separated from, and in no way interfering with, the regis-

tration of the medical practitioner. But we failed to convince the Medical Council, and the charter was wisely accepted by the College of Surgeons, giving us nine-tenths of what we required, and leaving the right to registration to be gained on some future opportunity. Had we gained more, perhaps our real gain would have been less, for the need of further exertion has been, and still continues to be, a bond of union, and a preventive against the apathy which often succeeds energy after a great purpose has been gained.

To guard against such a contingency a committee was appointed, and still exists, whose duty consists in watching any acts of the legislature likely to affect the dental surgeon for ill or good, and endowed with the power to act, in case action should seem desirable, and such action has been taken more than once when pending bills offered a chance of registration.

The College of Surgeons, on gaining the charter, took the initiative, and required that we should agree upon a curriculum, and, in conformity with an early promise, establish a school fully organized to give practical effect to the educational scheme, which we had so persistently pressed upon them. With the organization of the Dental Hospital and School, the labour of originating was completed, and it remained only to insure success that the newly-formed institutions, or I should prefer to say, the departments of one comprehensive educational institution, itself a department of the great subject of surgery, should be worked with well-directed energy.

I should not be doing my duty to those who are no longer amongst us, did I not tell you that the material steps by which our educational edifice has been constructed were not taken fortuitously, but were the parts of a carefully considered measure, the outline of which was communicated to the representatives of the College of Surgeons, before that body moved the first step toward the formation of its dental department. Mr. Green and Mr. Lawrence, convinced by the able advocacy of Mr. Arnott, became active supporters of the measure. And we may with pride point to the facts that they, alike distinguished for their learning and great eloquence with Mr. Arnott, constituted the surgical section of the first Board of Dental Examiners. It is to the latter friend, however,

that our gratitude is especially due, but for whose steady support, often given at times when support seemed almost useless, our cause must have been lost, and our labours, as in the attempt made in 1843, thrown away.

I cannot, in recounting our obligations, omit the name of Mr. Balfour, the late secretary of the College of Surgeons, who, from an advantageous position, lost no opportunity of advocating our cause.

We have been helped, and we have been helpful, and I do not fear to say that the senior members of our body look with excusable pride upon the high position of usefulness and respect to which our society and school have risen. I cannot separate them. The society is an adult school, where the members teach each other by recording and discussing the results of research and of practice; while, in the school and hospital, the student receives his instruction from one or other of our members, and, on attaining a competent knowledge of the subjects taught, becomes, in most instances, himself a member of the society. The school is the great training-ground from which we select our successors, our assistants, and the members of our society; and from the society we select our lecturers and dental surgeons. As I have said before, they are the several departments of an educational body, and I should be grieved to see their relations less intimate, —a feeling, I think, common to those who were personally concerned in their creation.

I have told you of our obligations to our lay friends. I must now remind you of our still deeper obligations to our past presidents, passed in every sense. They cannot speak for themselves, but I will speak for them, though it be but too feebly.

Mr. Cartwright, our first president, though much out of active professional life, gave us all the encouragement in his power.

John Parkinson, the second of our presidents, was always present at our meetings; and that directness of purpose and kindliness of thought, not unknown to other members of his family, were unfailing bonds of union amongst the newly-gathered members of council.

Arnold Rogers, the third to occupy the presidential chair, gave us all he had,—his mind, his time, his purse, —ever regarding the claims of the society as prior to

those of social or private life. He attended our meetings almost unfailingly long after his declining health shut him out from general society, and in great part from the practice of his profession; when no longer able to leave the house, excepting, perhaps, at rare intervals, he acted as our treasurer; and none but his most intimate friends knew how frequently he taxed his pocket in the behalf of the society, or for the purpose of saving its funds.

Mr. Harrison, the fourth on our list of presidents, was born for public work. He at all times, and under all circumstances, quite naturally gave precedence to public, even when the claims of private duties were to ordinary minds the more pressing. His respect for laws, his love of order, and wonderful memory, extending even to the recollection of minute details, with his ready and complete acceptance of the voice of the majority, were qualities that fitted him beyond most men for the offices of counsellor and president. All who enjoyed the advantage of acting with and under him will agree with me, that he filled those offices admirably, and that we have never failed to miss his presence at our meetings.

William Minshull Bigg succeeded Mr. Harrison. He was the representative of two generations. Both his father and grandfather, Mr. Minshull, held leading practices in London, and the grandson could tell us more of the past ways of practice than most other men. He was as regular an attendant at our gatherings as feeble health would permit, and ceased only to come amongst us when sickness drove him from all professional occupation.

I cannot claim to have given you a sketch of our professional history, for there are many points I have not even touched upon. It has been at most but a sketch of a sketch, and taken from memory. The work of years cannot be described in a short address; but if I have succeeded in adding to your knowledge of, or interest in, the early doings of our society, then my end has been gained.

Furthermore, if my presence in this position, and the account I have given of the prolonged labours of many of the senior members of our profession, to place at the disposal of their successors a complete education, should tend to induce our students to avail themselves of these educational opportunities; and of the valid testimony, the

dental diploma gives that they have become accomplished dental surgeons, then great indeed will be my gratification.

The Odontological Society has been and still is, the representative of the dental profession; through its influence the scattered units of the profession were brought together and united into a brotherhood; by it the Legislature and College of Surgeons were moved to give us the dental diploma, and the hospital and school sprung up at its bidding. And, gentlemen, the future of the dental profession is mainly in its hands,—in your hands. The degree of wisdom and energy, devotion and personal sacrifice with which you conduct the society,—I mean the society in the broadest sense,—will determine the degree of usefulness of the dental surgeon, and hence his place in public esteem.

The older—perhaps I had better say the oldest—members have done much,—it may be as much as they could or can do,— and they look to you to do more. Rendering still such assistance as they can, they hold you responsible for the future of the society, and, through it, for the future well-being of the profession. I do not think I have at all over-stated the case.

In conclusion, I must ask you to support your president by individually contributing at our meetings the results of research and of experience in practice, so that he may be enabled to conclude his year of office with a report as favourable as that we have recently heard from your late able and energetic president, Mr. Sercombe.

CRITICAL ABSTRACTS.

DR. OGSTON ON CONGENITAL MALFORMATIONS OF THE LOWER JAW.

(GLASGOW MEDICAL JOURNAL.)

(*Continued from page* 225.)

B. CONGENITAL UNILATERAL SMALLNESS OF THE LOWER JAW.

"The teeth of the left lower jaw are somewhat smaller than those of the right. On the left side there exist two incisors, one canine, and two bicuspids; the first molar has been extracted, but the stumps of the second molar and wisdom tooth are still present, their direction, however,

being so much inwards that it is evident these teeth had never been opposed to those of the upper jaw. Her compliment of teeth in the left lower jaw had therefore been complete. In the right lower jaw all the teeth are present and entire, except the second molar, which has been extracted, the gap left by it still remaining. The length from the mesial line to the canine angle is nine-sixteenths of an inch on the right side; the length from the canine angle to the anterior border of the ascending ramus is an inch and five-eights on the left side, and one and three-quarter inches on the right side. In fact, the left side is atrophied in all its segments, and proportionally in all.

"When the jaws are closed, a gap, one-twentieth of an inch wide, exists between the upper and lower teeth of the left side, but those of the right side are in close contact. The left teeth, both upper and lower show no attrition facets where they should exist, but these are present, as usual, on the right side, both above and below.

"The usual number of teeth have been present in both superior maxillæ; on the right side they are still perfect, excepting the first bicuspid, the stump of which remains; on the left side the canine has been extracted, the three molar teeth are represented by their stumps, and the other teeth are entire. But all the left upper teeth are smaller than those on the right side. Nowhere, either in the upper or lower jaw, is there any undue crowding of the teeth.

"The hard palate is more arched than usual, and the horizontal portions of the superior maxilla and palate bone are slightly smaller on the left side.

"The soft palate is of a pale bluish purple colour, and well formed in both halves, though the left half is more flabby to the feel, and thicker in its perpendicular diameter (thickness) than the right half. The lower border of left half hangs fully a quarter of an inch lower than the right, and by no mechanical irritation can any motion or elevation of the left half be caused, save that which it derives from the right half, the muscles of which react normally. The left levator and tensor palati are evidently absent, or rudimentary.

"The cranium is asymmetrical; although this is rendered less distinct, and satisfactory measurements are not attainable from her manner of dressing her hair. She obstinately refuses to undo her coiffure. The following points can

nevertheless be clearly made out:—The left side of her cranium is somewhat smaller than the right, both in its horizontal and perpendicular measurements, a fact of which examination on three several days leaves no doubt. Horizontal measurements are not attainable, but from a point over the anterior end of the sagittal suture to the lower border of the zygoma, the measurement on the left side is five and a half inches, on the right side six inches. Another measurement from a point over the front of the sagittal suture to the angle of the lower jaw gives nine inches on the left and eleven inches on the right side.

"Sensation of the left side of the face was perfect. The left temporal and masseter muscles were small and their contractions feeble compared to the corresponding muscles on the other side. The action of grinding the teeth was well carried out, the right side of the jaw and its muscles being principally though not entirely concerned in its production. She could protrude the lower jaw with ease, but only to a limited extent, the range of motion in this direction being less than a quarter of an inch, and being mainly though not entirely, affected by the right side and its muscles."

IV. CONGENITAL DISLOCATION OF THE LOWER JAW.

This has only been recorded in one case, and in that instance, the record is so insufficient and unsatisfactory, that it is but of little value as forming a ground work for any conclusion.

Dr. Ogston then concludes with the following proposition:—

1. "Congenital deformities of the lower jaw are very rare.
2. "Non-development of the lower jaw has been recorded in animals, but never in man.
3. "Excessive development of the lower jaw appears to occur, though very rarely, and minutely recorded cases of it do not exist.
4. Preponderance of size of the lower jaw has been observed as the result of deficient development of some of the other facial bones.
5. "Congenital smallness of the whole lower jaw occurs, and is generally asssociated with symmetrical deformities elsewhere.

6. "Congenital smallness of the whole lower jaw may lead in after life to acquired deformities of the bones of the cranium and face.

7. "Congenital unilateral smallness of the lower jaw has been found in one case with, and in two without, formation of the temporo-maxillary articulation of the same side, and coincided in all with asymmetry of the cranium.

8. "Congenital dislocation of the lower jaw is said to have been met with in a single imperfectly recorded case.

LE PROGRÈS MÉDICAL.

UPON CYSTS OF THE LOWER JAW.

BY CH. REYNAUD.

Do all the cysts which are developed in the lower jaw arise in the dental system? M. Magitot says yes; M. Ch. Reynaud says no; and discusses this question in a very good treatise, such as we are accustomed to read from many of the pupils from the Lyons school. The Faculty of Medicine, which a recent decision of the National Assembly has just accorded to the second town in France, exists, in fact, by the distinguished members, which compose the Lyonese medical body and by the teaching of its school; it is but justice to recognize this publicly.

M. Magitot, in an excellent monograph, in which he has studied the evolution of the dental follicles, appears to us exclusive in maintaining the opinion we have maintained above. Why, indeed, if other bones undergo cystic transformation, may not also be formed in the lower jaw accidental cavities having for their point of departure a dental follicle or a carious tooth. When all the teeth are well developed; when an anatomical examination of the cysts does not admit of attributing them to supplementary follicles, it is logical to admit in such a case the pathogenic process. As for other cysts of the osseous system, M. Guyow thinks for his part that cysts developed in persons who have passed thirty years should not be considered follicular.

M. Reynaud cites several observations from the clinic of Professor Desgranges (of Lyons), which appear to prove him right. The author, it must be said, only combats M.

Magitot on clinical grounds. But we accept his conclusions tending to condemn the exclusiveness of M. Magitot and those in which he maintains that in practise "we cannot accommodate ourselves to absolute precepts, and that formulated doctrines without restrictions are rarely unassailable."

This point in pathogeny constitutes the original side of M. Reynaud's work, which can only be verified by new observations. There would result, according to the author, different deductions with reference to the diagnosis and treatment, the non-dental cysts being much more serious, and requiring always, when they are voluminous, a radical operation. M. Renaud, following the counsel of Professors Richet and Vernent, advises the extra-buccal operation in all cases possible.

DR. BOUHEILLER.

CAUSES AND SYMPTOMS OF FRACTURES OF THE UPPER JAW.

BY DR. LEHERIBEL.

THE mechanism and the symptoms of fractures of the upper jaw are still surrounded by a certain obscurity. It is to throw some light upon this difficult point of surgical science that our excellent friend, Dr. Lehéribel, has chosen it as the subject of his inaugural treatise. In a few words we shall give a *résumé* of the original views contained in this work.

With reference to the causes and mechanism, there exist two varieties of fractures of the upper jaw; fractures by direct causes, and fractures by indirect causes. Fractures by direct causes occupy a special region of the upper jaw (ascending apophysis of the jaw, orbital floor, palatine vault, alveolar border, &c.), or even affecting different parts of the bone; transverse fractures, oblique or vertical. Fractures by indirect causes are due to causes acting solely on the lower jaw, the latter being violently carried against the upper (a blow from the fist, a blow from a horse's hoof on the chin, fall from a great height, the individual being suspended by the chin), or at the same time upon the lower maxillary and upon the vault of the skull (the individual falling upon his chin upon the edge of a trap-door, the lid coming down upon his head).

2nd. With regard to symptoms it is proper to distinguish (A) fractures appearing with classical signs (displacement, mobility of fragments, crepitation etc.); (B) fractures not recognized by ordinary classical signs: these are often fissures, disjunction, osseous sutures, diastosis. To diagnose we must look for painful spots at the level of the sutures, ecchymosis, and finally, for enervation in the region where the nerve roots are distributed which could be affected.

H. DURET.

STETTER ON RESECTION OF THE INFERIOR DENTAL NERVE.

(London Medical Record.)

Dr. Stetter *(Berliner Klinische Wochenschrift*, no. ii. 1875.) reports a case in which Prof. Schoenborn, of Konigsberg, removed a considerable portion of the inferior dental nerve by first dividing it in the mouth of the patient, and then by removing part of the anterior wall of the dental canal. The patient, who was a woman aged sixty-four, had lost most of her teeth before the age of thirty, when, in consequence of fright, she suffered during a period of three months from occasional attacks of severe cramp and painful convulsive movements of the limbs. When forty-eight years of age, she was again much frightened by the attack of a dog, and from that time suffered from frequently repeated attacks of spasm and pain on the left side of the face, the intervals between these attacks having, up to the time of her admission, become more and more frequent. When first seen by Professor Schoenborn, the patient, who was much emaciated, complained of very severe radiating pains on the left side of the face, especially about the lower jaw. The intervals between the attacks varied in duration from five minutes to a very few seconds, and during each attack the affected side of the face was fixed by muscular spasm. The woman was able to ease the pain by simultaneous pressure with her fingers on the inner surface of the lower jaw in the region of the aperture of the dental canal, and on the outer surface of the bone. After the patient had been treated for two weeks by injections of morphia without any good result, Professor Shoenborn decided to have recourse to neurectomy. As the patient referred the most intense pain to the region of the inferior dental canal, it was held that the cause of the affection might probably be found in the portion of nerve which was contained therein, and that a cure might be affected, or at least considerable relief afforded, by removing that portion. With this object in view, Professor Shoenborn first divided the inferior dental nerve in the mouth near the aperture of the canal according to Paravicini's method, then cut down upon the front of the lower jaw and removed with the chisel a portion of the anterior wall of the canal, and finally pulled out and excised a portion, about six centimètres in length, of the inferior dental nerve. In the first stage of the operation an incision was carried along the inner surface of the lower jaw over the course of the inferior dental canal from the aperture downwards and inwards, and

afterwards for a short distance upwards towards the neck of the bone. The mucous membrane and periosteum were cut through and elevated along the whole of this wound, and the loose cellular tissue between the internal pterygoid muscle and the ramus of the jaw partly pressed on one side by the fingers and partly removed. After some slight bleeding had been suppressed, the lingual nerve could be seen, and behind it, on the outer surface of the internal pterygoid muscle, the inferior dental nerve and artery embedded in cellular tissue. The lingual nerve having been drawn aside by a small blunt hook, the inferior dental nerve was carefully dissected away from the artery and enclosed near the aperture by a ligature, the two ends of which were brought out of the mouth. The anterior wall of the canal lining these, in the second stage of the operation, was chiselled away over an extent of one centimètre and a half; the nerve was divided as far as possible above the aperture of the inferior dental canal, and then dragged out through the external wound. The dissection of the parts within the mouth and the division of the nerve were much facilitated in this case by the absence of teeth and the absorption of the alveolar process of the lower jaw, the conditions being similar to those met with in infants and very old people, and generally in edentulous subjects. On the first and second days after the operation there was no relief; on the third and fourth days the neuralgic pains were not quite so severe, and on the fifth day they ceased altogether. When seen six months after the operation, the patient was quite free from pain, and stated that she had not suffered from any relapse.

Dr. Stetter holds that Paravicini's method of dividing the inferior dental nerve within the mouth is to be preferred to the subcutaneous method, since in practising the latter it is difficult to avoid wounding the lingual nerve or the inferior dental artery. In conclusion, he argues that neurectomy in cases of neuralgia, though very uncertain in its results, may be considered a justifiable operation when applied as a last resource for the relief of very severe and intractable forms of this affection.

W. Johnson Smith.

Pathological Society of Dublin. Saturday, January 30th, 1875. Robert McDonnell, M.D., F.R.S., President, in the Chair. *Giant-Celled Sarcoma of Lower Jaw.*—The President showed a tumour of the lower jaw, which he had removed from a boy, aged 11. Eighteen months before, a small tumour was first noticed at the root of one of the canine teeth. It grew rather rapidly, and was an example of myeloid sarcoma. The normal bone was expanded so as to cover a large part of the growth. Microscopical examination showed the tumour to be a giant-celled sarcoma (Virchow).

Cutter on the Action of Flour on the Teeth.—In an article entitled "Does the Use of Flour promote Decay of Teeth?" in the *Boston Journal of Chemistry*, Dr. Ephraim Cutter discusses the question whether the prevalence of caries of the teeth is due to the use of wheatened flour and to the disuse of whole-grain flour, and concludes in favour of the more extended use of whole grain as an article of diet for children, but at the same time urges the necessity of more extended experiments in regard to the influence of whole grains of wheat-meal, oat-meal, corn-meal, beans, etc.

[It has long been noted in this country that in those districts where the use of oatmeal (in place of wheaten flour) prevails, we find children and adults with the best developed teeth and jaws; and so well recognised is the influence of oatmeal diet upon the teeth, that many practitioners order its use as an article of daily diet for children, in cases where the dentition seems likely to be either retarded or imperfect.—*Rep.*]

OAKLEY COLES.

ON THE EXTRACTION OF THE SECOND MOLAR TOOTH AS A PREVENTATIVE AND CURATIVE MEANS AGAINST ACCIDENTS OCCASIONED BY THE WISDOM TOOTH.

BY DR. C. E. BOURDIN.

THE eruption of the third molar tooth, called the wisdom tooth, sometimes gives rise to grave accidents. These accidents, very varied, may easily be accounted for by the anatomical disposition of the lower jaw. In fact, the body of the lower jaw consists of a single piece of bone, limited at the back by a higher portion, which gradually bends almost to a right angle with the horizontal portion, in which is implanted the alveolus. The teeth occupy the alveolus in succession, so that in time, in certain cases, the whole of the horizontal portion of the jaw is furnished with fourteen teeth, which precede the appearance of the wisdom teeth. The body of the jaw being entirely occupied, an enlargement of the horizontal portion of the bone is produced in order to make room in the alveolus for the wisdom teeth. This is what generally happens. In some rare cases the enlargement is not sufficient, or even does not take place at all. The wisdom tooth cannot undergo its normal evolution for want of sufficient space. Then a combat ensues. The new tooth making vain efforts to take its place, compresses the flesh and the bone, and by reason of this separate pressure gives rise to two series of accidents. Either the inflammation may be so great as to lead to suppuration; or, on the contrary, nervous pains, characterised by spasms, may arise, or, most frequently, the most intense neuralgic pain occurs.

The accidents in question are generally occasioned by the pressure exercised by the wisdom tooth. This tooth acts simply by its own volume, or sometimes by the wrong direction, which it is obliged to take in the absence of sufficient space for its normal development.

Examples in support of this pathological position are not wanting in the annals of science. I desire, however, to give with some details the history of a fact which has not yet been publicly given, and which presents circumstances worthy of being noted with interest in practical surgery.

Obs.—A young Belgian enjoying excellent health, had arrived at the age of 25 years without having had any disease of the mouth. The wisdom tooth commenced its evolution. Unfortunately, the second molar was so close to the ascending ramus of the maxillary bone, that for the new comer there was not sufficient room. This, besides contrary to its normal disposition, had taken a horizontal direction. By the effect of its natural development, the wisdom tooth gave rise to pressure against the second molar which could not give way at all, being kept in its place by a magnificent row of teeth in good condition. Neuralgic pains ensued.

The patient had recourse to the wisdom and counsel of men of skill.

All doctors and dentists declared that the wisdom tooth was the sole and only cause of the evil. The remedies prescribed failed, they waited; finally it was decided to extract the wisdom tooth; the indication was clear, but operation presented great difficulty. By the aid of a fine bent probe, passed behind the second molar, the presence of the wisdom tooth was verified, but no instrument suitable for extraction could be put into this narrow passage; several attempts at extraction were without success. It was seriously thought, then, of some serious operation, which so alarmed the patient that he withdrew. Our Belgian took route for Paris.

The dental surgeon Lallement was consulted. Like all his colleagues previously consulted by the patient, the Paris Surgeon was of opinion that the wisdom tooth was the cause of the evil; but contrary to the opinion of all, he declared he could preserve the wicked tooth, the cause of so much suffering. Lallement was under no illusion as to the difficulty of extracting the wisdom tooth; he considered it absolutely impossible by the aid of instruments in use or by ordinary methods. A formidable operation would alone ensure extraction. In this state of things the Surgeon proposed the extraction of the second molar, as it was against this tooth that the pressure exercised caused the painful neuralgia. The patient easily understood that the disappearance of the second molar would leave a space in which the wisdom tooth might freely develop. In case of non-success, and supposing that the wisdom tooth itself was the cause of the neuralgia on account of caries of the imprisoned tooth, there still remained the resource of extraction of the wisdom tooth, an operation now quite possible by the previous removal of the second molar. I should add that the operation was quite easy, without the assistance of great or difficult preliminary operations. The patient no longer hesitated. The second molar was extracted. From that moment the neuralgic pains disappeared as if by enchantment; the patient was able to use his jaws and eat like everybody else—a cure was obtained. The gordian knot was cut, not untied. Never mind. An excellent tooth was sacrificed, but the patient was cured.

From this very simple fact we may draw a general conclusion. If the wisdom tooth shackled in its evolution by the pressure of neighbouring teeth can give rise to such grave accidents, why not establish it as a rule, to sacrifice the second molar in order to give space to the wisdom tooth. The interest of the patients commands us to act thus. Who is the person who would hesitate to sacrifice a tooth even in good condition, to avoid the production of osteitis, purulent cysts, suppurative inflammation of the ganglions of nerve, followed in different parts of the face and neck by burrows and fistulous openings of great length, and hideous wounds which leave indelible marks. Who would draw back from such a sacrifice, when it was a question of freeing oneself from spasms of the masticating muscles, or of obstinate neuralgia which profoundly disturbed the constitution, and at length destroyed the health, besides being a serious obstacle to the fulfilment of social duties. When the Surgeon has frankly made known to the patient the cause of the pain and the accidents which may arise from it, when opposite this picture of the evil, the treatment with its ordinary happy consequences is shown, all hesitation would cease, and the patient would place himself with confidence in the hands of the Surgeon.

Final Conclusion.—The removal of the second molar of the lower jaw, might be practised as a preventative or curative means. In both cases

the object of suppression of the second molar tooth is to give space for the wisdom tooth, either by permitting its normal and regular development, or to avoid severe pressure, a source of serious accidents, or finally, as a curative means against these same accidents.—*Gazette Medicale de Paris*, January 23.

ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

Ordinary Monthly Meeting, April 5th, 1875.

G. W. Buchanan, Esq., Vice-President, in the Chair.

Mr. Charles Tomes exhibited to the meeting a specimen of an odontome which had been extracted by Mr. David Hepburn, and said that the Society had received from Mr. Omery, of Simla, a number of skulls.

Mr. Frank Henry said he knew the case of a little girl, 8 years old, who had had an abscess form in the cheek, after the extraction of a lower molar; and on examining the cheek, there was seen to be a large hole in it through which a hen's egg might be passed. Several pieces of necrosed bone were removed, and the cheek was found to be cicatrised down to the jaw, causing the mouth to pucker very much and sadly disfiguring the child. A large portion of the jaw near the molar and bicuspids had been lost. He believed that most of the external mischief arose from too much poulticing, and that had led to the very great sloughing that ensued.

Mr. Coleman exhibited a dentist's bag constructed by Messrs. Arnold, surgical instrument makers, of Smithfield; and also a box, which contained an apparatus by which nitrous oxide could be administered with or without combination with ether.

Mr. Sewill exhibited a specimen of calcification of dental pulp, taken from the mouth of a patient who had been struck with a stone, and had had the crown of the central incisor broken.

Mr. Charles Tomes gave the results of some experiments which Mr. Ewbank and he had made with reference to water tight fillings. He remarked that most of the fillings might be described as contour fillings, and were made on very difficult cavities; they were mostly made in fresh teeth, some being made in dry teeth which had been soaked in water for three or four days. Experiments were made with dry teeth and with fresh teeth without any difference in the result being detected. Oxi-chloride fillings were always successful. They were never successful in making water-tight fillings with Hill's stopping, although the experiments were made under every possible condition. The results

were all more or less unsatisfactory with Fletcher's platinium and gold amalgam; but it was not so with Fletcher's expanding amalgam, that was found to be a substance from which water-tight fillings could generally be obtained. Success was almost uniform with palladium, any leakage that might occasionally occur being very slight indeed. Experiments were then made with gold fillings. No large or difficult fillings were made with soft foil in the least cohesive condition, as it was an established fact that water-tight fillings could be easily produced with soft foil. A number of composite fillings were made, the cavity being filled partly with soft and partly with cohesive foil, tolerably rapidly; the part lined with soft foil was absolutely water-tight, while that lined with cohesive foil was quite the reverse. With the foil in the highest cohesive condition success could be obtained only by using it in very small pieces, which involved the expenditure of much time and labor. A few experiments were made with sponge gold, used slowly; some were successful but others failures, in consequence of a too rapid operation. Since the experiments were made, he (Mr. C. Tomes) had met with a paper by Dr. Bogue, read before the New York Odontological Society recording many experiments on the contraction of various amalgams, and on the making of watertight or non-watertight fillings. Dr. Bogue had met with an higher measure of success than himself and Mr. Ewbank, in getting watertight fillings. A solution of indigo was the solution he employed, but of what kind was not stated. Draper's ink was the solution employed by himself and Mr. Ewbank. Dr. Leslie had given him an artificial pivot cavity which on experiment had proved perfectly watertight. It was indicated, by the result of the experiments laid before the Society, that, whenever it was possible, there should be soft foil against the walls of the cavity and not cohesive. It was hardly possible to have a failure with soft foil, and very difficult to attain success with highly cohesive foil.

Mr. FLETCHER said he had been investigating the same subject with regard to cohesive gold. He had made some large plugs in square cavities with two sides open in many cases without retaining points. He could, in nineteen cases out of twenty, get them perfectly tight with cohesive gold by using burr-headed pluggers. In practice, he found that he could use cohesive gold as quickly as soft foil, but peculiar management was required. He thought with regard to plastic fillings for tight plugs that expansion or shrinkage had little to do with the matter. The two amalgams, which gave respectively the least and the greatest shrinkage, in Dr. Bogue's experiments, produced moisture tight plugs; while several failed with intermediate points of shrinkage. More depended on the nature of the fillings and the way in which it was used. A short time since an alloy was recommended because it had a trace of expansion, but it would not work in a damp cavity. If management were used, it was possible with an alloy which expanded, to get either good or bad result; and in the case of an alloy having a distinct shrinkage, if it were made into small pellets or discs, and worked on to the surface of the cavity so as to get perfect contact, unless the shrinkage was very great indeed, the plug would be a perfect one. He produced several plugs which he had made and thought they plainly showed that failure or success depended much more on the operator than on the properties of the amalgam employed. He believed that the failure of nineteen out of twenty was entirely owing to the presence of moisture, and he had only been able to

reproduce those failures in the mouth, for which he could not account, by packing in wet cavities. In answer to Mr. Sewill, Mr. Fletcher said that the best way of drying a cavity was to apply a solution of gum copal in ether, to which a small quantity of collodion should be added.

Dr. LESLIE said that many years ago a substance called the "Royal Succedaneum" was introduced into Cincinnati by an Englishman. He filled a great number of teeth with it, but paid no attention to the cleaning out of the cavities or making excavations. The material was in many instances placed in cavities where a nerve was exposed, the result was that patients went to dentists to have the tooth taken out. On a portion of the material being brought to him he analysed it, and produced an amalgam similar to the best amalgam of the present day. That amalgam was used at the time, but was condemned shortly after by the leading member of the profession: however, since the days of Townsend its use was again resorted to. In what was said by a previous speaker he quite concurred, namely, that very much depended on the condition of the cavity and the manner in which the material was used. Mercury seemed to possess a wonderful power for solving the crystalline mass subjected to its action. He had in his possession amalgams which weighed now exactly the same that they did when he first mixed them, not a single grain having been lost. Were he asked to explain why gold fillings not adhesive should be watertight, while cohesive gold filling should not be watertight, he would reply, that on the point coming into contact they became hard—suddenly solidified. That was one reason why gentlemen who made the experiment said that they always had a perfectly watertight filling, when they had used very small pieces. If cohesive gold were exposed for some time it lost its cohesive quality. He knew that many gentlemen could make equally good operations with one kind of gold as with another. However, it was a very different thing to fill a tooth out of the mouth and one in the mouth; in the former case the circumstances were under the control of the operator, in the latter they were not.

Mr. TOMES mentioned that Mr. Makins had, 25 years ago, produced a similar article to that exhibited by Dr. Leslie, and he now produced some samples of it for the inspection of the members.

Mr. MAKINS exhibited specimens of the material of crystalline gold, stating that the making of it had been suggested to him by Mr. Tomes. He had produced a considerable quantity, but his other avocations prevented his continuing the manufacture. He said that the conditions under which gold was precipitated were very curious, and it was difficult to get it other than crystalline.

Mr. COLEMAN said it would perhaps be interesting to inquire whether watertight fillings were more durable than those which were not perfectly watertight. It was curious to notice the difficulty of making a filling of Hill's stopping watertight, and yet it seemed to preserve the teeth; it might be that those bodies were, to a certain extent, elastic, and had a slight tendency to expand. It was important to ascertain first, whether the quality of being watertight was an essential one, and if it was, they might then endeavour to ascertain what, in cases where it was impossible to have a watertight filling, was the best substance to be used in its stead.

Mr. CHARLES TOMES said that the antagonism was more apparent than real, between Mr. Fletcher's experiments, and those of Mr. Ewbank and himself. They had attempted to find out what could practically be done with difficult cavities such as were met with in a mouth, and in no

instance had they taken anything so favorable as a cylindrical cavity, except for one of the very small adhesive gold fillings. He believed with Mr. Fletcher, that to make watertight fillings with amalgam that shrank a good deal was possible, supposing that the amalgam could be so manipulated that the direction of the shrinkage should be such as not to pull it away from the sides of the cavity. They had not had many successes to record except with palladium, and with Fletcher's expanding amalgam. He believed Mr. Fletcher put less value upon his expanding amalgam than he did upon his platinum and gold.

Mr. FLETCHER said that the expanding amalgam worked badly in wet cavities, and that in the hands of a careless operator platinum was a safer material. He could make moisture tight and perfect plugs, in any shape, and in any position, even on a flat surface.

Mr. CHARLES TOMES said that in the experiments he had mentioned, most of the results obtained were unsatisfactory, and with most amalgams, he could not see his way to the making of water tight fillings in the mouth; whether such fillings were absolutely essential was another matter.

The CHAIRMAN thanked Mr. Tomes and Mr. Ewbank for their interesting communication. He said that as to gold stopping, it was not material what kind of gold was used, the success in 99 cases out of 100 depending more upon the manipulation; whereas in the case of amalgams the operator was necessarily at the mercy of the material employed.

IMPERFECT TEETH AND ZONULAR CATARACT:

BEING THE SUBSTANCE OF OBSERVATIONS AT THE PATHOLOGICAL SOCIETY, MARCH 2, 1875.

By JONATHAN HUTCHINSON, F. R. C. S.,

Surgeon to the London and Royal Ophthalmic Hospitals.

For some years past, it has been a matter of general knowledge amongst ophthalmic surgeons that, when children are the subjects of cataract, they usually show also badly developed teeth. I do not know with whom this observation originated, but it is acknowledged in most of our standard works. By some, the malformations have been supposed to be connected with inherited syphilis; and by others they have been associated with rickets and with general defects of development. My object in the present paper is to endeavour to give a little more precision to our knowledge in respect to the coincidence of these conditions. In attempting to do so, it is necessary first to state that I believe that imperfect teeth are, as a rule, met with in connexion with one form only of the cataract of childhood. The form to which I allude is known as the "lamellar" or "zonular" form, and is very peculiar. In it, neither the nucleus nor the peripheral part of the lens is

opaque; a thin layer of fibres, at a greater or less distance from the nucleus, and completely surrounding it, being alone involved. The defect is compatible with very fair vision, and is often not detected until the child attempts to learn to read, sometimes not even till adult life. It is, I believe, almost invariably symmetrical, and is in a large number of cases quite stationary. It is not associated with any special diathesis, and it is very exceptional to meet with it in more than one member of a family. All these facts would suggest that it is probably the record of some temporary disturbance in the nutrition of the lens, rather than the result of any permanent peculiarity in the patient's state of health. It may be added, in support of this view, that lamellar cataract has not, I believe, ever yet been recognised at the time of birth, but is generally discovered at earliest during the first few years of the child's life. The *congenital* cataract belongs probably to a wholly different category, and is not lamellar. Whilst the congenital forms are often attended by other defects in the development of the eye, and with very imperfect vision, the lamellar opacity is, I believe, as a rule, the only defect to be found in the organ.

I must next describe the kind of defect in the development of the teeth which it is usual to meet with in connexion with these curious cataracts. It is wholly different from that met with in congenital syphilis, and consists not so much in alteration of the form of the teeth as in defective development of the enamel. It is very often met with in association with the malformations which characterise hereditary syphilis, and hence probably some of the confusion which has resulted. The incisors, the canines, and the first molars, are the teeth which suffer most; and as a rule, with but very few exceptions indeed, the bicuspids escape entirely. The contrast between the clean, white, smooth enamel of the latter, and the rugged discoloured spinous surface of the first molar, is often very striking. The first molars may, indeed, be counted as the test teeth as regards this condition; just as the upper central incisors are in that which is due to syphilis. In these teeth, it occurs equally in both jaws. They are sometimes affected when all the other teeth escape, and I believe they never escape when the others suffer. I have been speaking throughout of the *permanent* set of teeth;

for here, as in syphilis, although the temporary teeth often show unsoundness, they do not, I believe, exhibit any changes upon which it is safe to rely for purposes of diagnosis. The drawings which I hand round will convey a good idea of the kind of defect which is meant. They show the incisors and canines in various degrees pitted, dirty, and broken, often presenting very sharp edges, and sometimes often spinous. In some cases, a horizontal line crosses the crown of the incisors and canines at one level; the part of the tooth below the line being narrower from before backwards, sharp and broken. Nondevelopment of enamel and erosion of the exposed dentine appear to be the essential features.

In the first molar, it is usually the surface alone which is affected, the sides of its crown being often covered with good sound enamel, whilst its surface is denuded, brown, and rugged.

I must next state that, although lamellar cataracts are generally attended by defect of teeth, yet the coincidence is not invariable. I have before me the notes of three cases, characteristic examples of lamellar cataract, in which the permanent teeth are stated to have been quite sound. The converse statement, that these peculiarites of teeth are often met with in patients who have not lamellar cataract, is a fact with which all will be familiar. In the face of these facts, it becomes difficult to entertain the hypothesis that there is any direct correlation between the nutrition of the lens and that of the permanent teeth, by which the coincidence adverted to might be explained.

Some years ago, Professor Arlt of Vienna made the important clinical observation, that those who suffered from lamellar cataracts usually had the history of attacks of convulsions during early periods of infancy; and my belief is, that it is in connexion with this fact that the dental defects are to be explained. As the result of a considerable amount of inquiry amongst those whose teeth presented the peculiarities described, my conclusion is, that the defects generally result from attacks of inflammation of the gums occurring in early infancy; and that, amongst the causes of such stomatis, mercury holds by far the chief place. There seems reason to believe that, in a large number of cases in which infants suffer from fits, mercury is given, and not unfrequently in large and repeated doses. I

believe that it also enters into the composition of some of the most popular teething-powders.

My suspicion is, then, that when malformed teeth are met with in connexion with cataract, they prove only that the patient has taken mercury in infancy, at a period when the enamel of the teeth was undergoing calcification. On this supposition, we have a ready explanation of the order in which the teeth suffer, since it is precisely that of their priority of development. A very considerable collection of facts justifies me in the inference which has just been stated. Of late years, in cases of lamellar cataract, I have always made it a rule to examine the teeth, and to enquire as to the history of fits, and as to the measure of treatment to which the patient was subjected in infancy. The connexion between fits and cataract seems almost universal; that between cataract and malformed teeth general, but with marked exceptions; whilst, when the cataracts and malformed teeth are found together, it is very exceptional, provided the mother of the patient can be seen, not to obtain testimony as to the treatment of the fits by means of mercury. Of course, in some cases, the evidence on the latter point is either not forthcoming, or imperfect, but in many it is most strong.

I wish it to be distinctly understood that nothing which I have stated above has any claim to novelty, excepting, perhaps, the attempt to explain the connexion between the different conditions mentioned. It is more than ten years since Arlt published his observations respecting the connexion between fits and lamellar cataract; and, exactly ten years ago, Dr. Davidsen, then a student at Zürich, embodied the views of Professor Horner of that university in an inagural thesis, in which most of the questions which I have discussed are entertained. I was not aware of the existence of this thesis (which was never published) until a few months ago, when it was obtained for me by the kindness of my friend Dr. S. L. Frank. Dr. Davidsen arrives at conclusions very similar to my own on most subjects, excepting the possible influence of mercury in producing the deformities of the teeth. This he does not even discuss, but speaks throughout of the dental defects as characteristically those of rickets. His table of cases does not place the coincidence between convulsions and lamellar cataract in such a strong light as do the facts

collected by Professor Arlt and my own. It is obvious, however, that a considerable margin must be left here for cases in which no trustworthy history of the patient's infancy was obtainable. Of these, Dr. Davidsen makes no mention, but he appears to count all cases in which no history of fits was given him as if their absence had been proved; and, as most of his patients were adults, a serious source of fallacy in the calculation of percentages is here introduced.

Professor Horner has favoured me, through Dr. Frank, with the statistics of seventy-eight cases observed by himself. In these he found a history of convulsions in 76 per cent., deformities of the teeth in 85 per cent., asymmetry of the head in 35 per cent., imbecility in 2 per cent., and rachitic malformations of the extremities in 4 per cent. The remark which I have just made as to the difficulty of obtaining accurately the history of the patient's infancy applies also to these percentages; and the 76 per cent. with history of convulsions must be distinctly understood to mean that, in this proportion, convulsions were proved, whilst probably they were by no means disproved in all of the remainder. Professor Horner, who has given great attention to the subject, still believes in rickets as the cause of the dental malformation, and does not think that the hypothesis of mecurial treatment as the cause would hold good in Switzerland.

Although it seems to me probable, as already stated, that the convulsions stand in the relation of cause to the cataract, and the mercury given for the convulsions in that of cause to the dental malformation, yet I by no means wish to imply a belief that these associations are invariable. Certain apparent exceptions occur which require further investigations before we are justified in entertaining confident opinions on these points. Thus I have several times seen sets of teeth which I should have considered characteristically mercurial, in cases in which all history of drug treatment in infancy was denied; and it must be admitted to be quite possible that other forms of stomatis will produce similar results. There are also certain rare cases in which zonular cataracts are met with in several members of the same family in the same or in different generations, and in some at least of these I believe that there is no history of convulsions, and that the teeth are not mal-

formed. Upon the peculiarities which attend this class of cases, however, more detailed information is required.

In reference to the suggestion of the Zürich investigators, that the peculiarities in the teeth, in the skull-bones, and in the general development, are all due to rickets, I must be allowed to say, that it is as yet wholly unproved. I am not aware that any author has described what are so freely spoken of as "rachitic teeth", if that term be applied, as it is by Dr. Davidsen, to the permanent set. Professor Vogel of Dorpat, in his work on *Diseases of Children*, states, in reference to the effects of rickets on the teeth, that, "as the disease disappears before the second dentition commences, these phenomena are not observed in the permanent teeth". Yet it is upon the state of the permanent teeth almost solely that the diagnosis of rickets in the Zürich *clinique* is based; for in only 4 per cent. did Professor Horner find evidence of rachitic malformation in the extremities. The irregular formation of the skull, defects in symmetry of the face, and mental peculiarities when present, are perhaps quite as easily explained by reference to the preceding attacks of convulsions as by the hypothesis of rickets.

By way of summary I think it may be stated—

1. That it is exceptional to meet with lamellar cataracts, excepting in association with an imperfect development of the enamel of the teeth; but that definite exceptions, in which the teeth are quite perfect, do occur.

2. That the kind of defect observed in the teeth consists in absence of the enamel, and is shown in the incisors, canines, and first molars of the *permanent* set, to the almost invariable exemption of the præmolars. That, for purposes of diagnosis, the first molars are by far the most important, and may rank as the test teeth, since they not unfrequently show the defect when the others escape.

3. That it is highly probable that the defects in the development of the teeth are usually due to the influence of mercury exhibited in infancy; although it is quite possible that other influences, attended perhaps by inflammation of the gums, may occasionally produce similar results.

4. That teeth of the kind alluded to are met with very often in persons who are not the subjects of zonular cataract.

5. That the very important observation made by Arlt,

that the subjects of lamellar cataract have usually suffered from convulsions in infancy, is fully borne out by further examination; and that it is very unusual to find lamellar cataract without such history.

6. That it is probable that there is a direct connection between the occurrence of convulsions in infancy and the development of lamellar cataract.

7. That, whilst there is every reason to believe that the defective teeth which are met with in connection with lamellar cataract are the results of mercury, the evidence seems opposed to the belief that the lenticular opacity is also due to the influence of the drug. The great frequency of mercurial teeth without lamellar cataract, and the not very infrequent occurrence of lamellar cataract without mercurial teeth, are opposed to this view.

8. That the very frequent coincident occurrence of lamellar cataract with defective teeth, is to be explained by reference to the frequency with which mercury is given for the treatment of convulsions in infancy.

9. That there is no reason whatever for supposing that lamellar cataracts have any connection with hereditary syphilis.

10. That, whilst it is certainly true that lamellar cataracts are commonly met with in young persons who show general defect of development, short stature, ill-shaped heads, defective intellect, dwarfed lower jaw, or other physiognomical peculiarities, yet there is seldom any proof of the existence of rickets; whilst it is quite possible that the peculiarities mentioned may be due to the disturbance of the nervous system in infancy in connection with the convulsions.

11. It is very important to distinguish between mercurial teeth and syphilitic teeth, and the peculiarities presented by each usually render this easy; the two are, however, as might have been expected, not uncommonly met with together.

The paper was listened to with much interest, and received with considerable applause.

The discussion was opened by Dr. Crisp. He remarked that he could not agree with Mr. Hutchinson that mercury had much to do with these teeth, for although he often saw mercury given in large quantities it did not produce them. Moreover, there must be some cause for the convulsions, and he thought the cerebral condition which gave rise to them was a much more likely cause of the condition of the teeth than the use

of mercury. He had seen many cases of *tremblement mercurielle* in persons who worked in mercury, and in one case he had seen a husband and wife and eight children, who were all living and the children brought up in a mercurial atmosphere, yet in none of them were there the kind of teeth described by Mr. Hutchinson. He mentioned that a child of his own who had had convulsions when eighteen months old, which were supposed to be due to a fall from a perambulator, had now these teeth, and although mercury was given, he did not believe the amount would have been sufficient to produce them.

Mr. HULKE thought that much praise was due to Mr. Hutchinson for the care and caution and philosophical manner in which he had worked out and brought the subject before the Society. But there were two considerations which led him to think that there were other agents at work in the production of lamellar cataract besides convulsions. One was that the disease occurred in lower animals; in fact, the first case, he believed, in which the disease was well worked out was in a cat, which he examined with Mr. Bowman in 1849. Since that time he had seen several cases in the lower animals. The other fact was that, although lamellar cataract is usually seen with only one zone of opacity, we may find two or three, with clear lens substance between them, the most central zone being very small, and, in some cases, certainly smaller than the lens at the time of birth. This fact would indicate that it must occur during intra-uterine life. He was under the impression that the bulk of the cases were congenital and not infantile.

Mr. POLLOCK expressed his indebtedness to Mr. Hutchinson for bringing forward the subject. He inquired whether the acute diseases of infancy might not influence the development of the teeth, just as a severe illness in adult life may mark the nails. The latter he had observed in himself, and in his own children he had observed that acute illness in which no mercury had been given, had marked the teeth.

Dr. HARE observed that with regard to the form of teeth there was one fact worth considering. The kind of teeth were those usually associated with rickets, a disease of which he had seen a good deal. Now, in rickets mercury was usually avoided, and whilst in the case of many children to whom he had given mercury largely for other diseases in infancy he had seen them grow up without these teeth, he had constantly seen them in cases of rickets when no mercury had been given.

Mr. HUTCHINSON asked whether Dr. Hare was speaking of rickets in infancy, and Dr. Hare replied that it was so.

Mr. THORNTON asked whether there was any connexion between these mercurial teeth and those of congenital syphilis.

Mr. THOMAS SMITH remarked that it was an important fact that, whilst in cases of children with congenital syphilis a great deal of mercury was given, they do not get the mercurial teeth, but those characteristic of syphilis.

Mr. WARRINGTON HAWARD had had the opportunity of examining the teeth of a large number of factory children in Lancashire, most of them under thirteen years of age. In many of them the peculiar teeth described were noted. He was unable to ascertain any cause—in fact, the children thus affected were for the most part quite healthy, and the proportion of rickety and syphilitic children was much less than in London. Hence it was probable that they had not taken mercury. We must remember the frequent coincidence of convulsions and rickets, and the

constant use by parents of "teething powders" in convulsions. He had seen a case in which salivation was produced by these powders.

Mr. HUTCHINSON, in replying, observed that Dr. Crisp had raised an important question by suggesting the possibility of the direct action of a cerebral lesion in producing the convulsions and the condition of the teeth; but so far as the case related by Dr. Crisp went, it afforded a proof of the views advanced by him (Mr. Hutchinson), as the child had taken mercury, and it was impossible to say that it had not produced the condition of the teeth. He regretted that he had not expressed his views clearly enough for Mr. Hulke to apprehend them, as Mr. Hulke's observations were not directed against the real statements of his paper. He had no idea that the mercury was the cause of the cataract or the fits. As regarded the double zonular cataract, he believed it was extremely rare, and he had not met with a case, but some of the cases in which it was recorded were very instructive. Thus in one case given by Davidsen, in the paper before mentioned, the child had been subject to fits for eighteen months, so that the two zones might have occurred at different periods from the same cause, and did not at all form an exception to the possibility of fits producing it. He had not met with the very small-zoned cataract mentioned by Mr. Hulke, but no doubt its occurrence would favour the view of an intra-uterine origin. He believed that he was right in regarding the disease as infantile and not congenital, as supposed by Arlt. The cataract is inconspicuous, and is not observed in the first few weeks of its existence; but if a cataract is seen in the first few weeks of infantile life his experience was that it was of some other form than the lamellar. As regarded the stomatitis, mercury was no doubt not the only cause; but with regard to Dr. Hare's observation, which agreed with Horner's, that these teeth are found associated with rickets, Mr. Hutchinson pointed out that Dr. Hare was speaking of the *temporary* teeth, whilst he alluded only to the *permanent* set. Vogel states, moreover, that the first set of teeth in rickets are bad, the permanent are usually healthy; and Horner found the rickety teeth in only 4 per cent. of cases of lamellar cataract; whilst Mr. Hutchinson had very rarely found signs of rickets with those teeth. The mercurial teeth might often be seen together with those characteristic of syphilis, and might even mask them. He would observe also that they must be distinguished from the teeth called *craggy* by dentists, in which large plates of the enamel are deficient. These are usually unconnected with any diathetic cause; they are often hereditary, and exist in several members of a family, whilst the mercurial teeth exist in one member, with a history of convulsions in infancy.

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The Missouri Dental Journal, February, 1875.

Alveolar Abscess—Causes of and Treatment. An easy method of Removing a part of the Inferior Dental Nerve within the Lower Jaw. A New Dental Chair. Discussion on Alcohol in the St. Louis Medical Society. How Soluable in water is Arsenious Acid. White's Dental Engine. Calcification of the Pulp. Leakage of some Amalgams. Expansion of Solids between the Freezing and Boiling Points of Water. An Open Letter. Replacement of a Tooth—A Case. Circulation in the Dental Tissues. Professional Hypocrisy. Geology. Cure for Tape-Worm. Frequency of the Heart's Action. An Organization which the French need. Capping Nerves. Resorption of the Dental Tissues. Seventh Annual Session of the Southern Dental Association. Mississippi Valley Dental Association.

The Missouri Dental Journal, March, 1875.

Calcification of the Pulp. The Duty of Practitioners to each other. The Eye Tooth and the Eye. Temporary loss of Sight caused by Pulpitis of a Canine Tooth. Neuralgia caused by Dying Pulps, cured by extraction of the Teeth. Histology of Dentine. Replantation. Ulcerated Tooth cured by Replantation. Reflex-Action of the Teeth upon the Nervous System. Atrophy of the Masseter Muscle caused by an Ulcerating Tooth. An instance of Reflex-Action. Celluloid—Root Fillings—Amalgam Tests. How to work Celluloid. Amalgams. Elevation of Dentistry. Letter from Dr. Gunning. Ninth Annual Commencement of the New York Dental College. Thirty-Fifth Annual Commencement of the Baltimore College of Dental Surgery. The Pain Obtunder. Seventh Annual Session of the South Dental Association.

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ORIGINAL COMMUNICATIONS.—Dental Therapeutic.—Dr. B. C. S. Beck. Capping Pulps.—Dr. James S. King.

DENTAL SOCIETIES.—Georgia State Dental Society.—Officers Elected for the Ensuing Year,—Committee to Report at the Next Meeting. American Denal Convention.

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Progrès Dentaire, Février, 1875.

Nerfs dentaires, par la Rédaction. Nos confrères hollandais, par la Rédaction. Luxation et fracture longitudinale d'une grande incisive supérieure, du côté gauche, par M. Trousseau. Des dents syphilitiques, par le Dr. Darin. Du cure-dent et de ses inconvénients, par le Dr. Andrieu *(fin)*. Anelectrotonus des nerfs dentaires, par le Dr. Althaus. De l'emploi de l'èlectricité, etc., par la Rédaction. Observation sur l'extraction d'une dent surnumêraire, par M Meiffren. De l'administration du chloroforme, etc., par M. Clover. Bibliographie : Nerfs dentaires, par la Rédaction.

Progrès Dentaire, March, 1875.

Le Congrès des dentistes, par lar Rédaction. Fracture des dents, par Car. Weld, traduit de l'allemand par le Dr. Darin. Société odontologique de New York, par la Rédaction. De l'administration du Chloroforme dans les opérations dentaires, par M. Clover (*fin*). De l'organsation de la chirurgie dentaire (généralités), par J. M. Trosseau. Manipulation du composé Godiva, par M. Hele, de Carlisle. Mèlanges de mastic et d'oxyde de zinc comme substance d'obturation provisoire, par Th. Rowney. Maniére de colorer l'or, par S. B. Caoutchouc dentaire, par Robert Hepburn, D.S. Questions à résoudre, par M. Salter.

NEW INVENTIONS.

Dr. F. Hickman's Disk Carrier for enabling the operator to adjust the disk at any angle to the driving shaft.

Dr. F. Hickman's Air Injector, to be adapted to the hand-piece of the Burring Engine. It injects a continuous current of air into the cavity, and operates to keep the cavity clear of bur dust, and the bur cool while in use.

An Automatic Gas Regulator for Vulcanizers.—This invention regulates the supply of gas according to the amount of pressure within the vulcanizer. The apparatus can be adjusted to any pressure desired.

Fletcher's Morter for Working Dry Amalgams into a Convenient Form for use in the Mouth.—An instrument to obviate "the common use of the objectionable process of mixing with excess of mercury and squeezing."

Fountain Mouth Protector.—A little device sprung over the hand-piece of the engine to serve the double purpose of protecting the tongue and cheek from injury by the disk, and at the same time keeps the latter wet while in motion.

Bancroft's Patent combined Rubber, Dam, Clamp, and Tongue Holder.

The Dental Factotum provides warm water for syringing the mouth, a warm and dry pocket for mouth mirrors, a receptacle in which gutta percha stopping may be warmed, and also a mica-annealing lamp.

Various stands for the convenient keeping of engine bits.

CHLOROFORM AND ETHER.

In view of the mortality in this country from chloroform, we feel called upon constantly to insist upon a fuller attention to the greater relative safety of ether. "The terrible and indisputable fact is, that no human care, wisdom, or foresight, can prevent occasional deaths from chloroform. On the other hand, only the grossest mismanagement can render ether inhalation fatal." This sentence we extract from the last number of the *American Quarterly Journal of Medical Sciences.* As the American experience of ether is very large, and as this Journal is the chief medical authority in the United States, we invite particular attention to this clear and pregnant statement. It would only lose by additional comment.—*British Medical Journal.*

THE DENTAL STUDENTS' SOCIETY.

Ordinary Meeting held March 8th, 1875.

David Hepburn, Esq., D.S., President, in the Chair.

Some very interesting communications were brought forward by Messrs. James Merson, Turnell, Hammond, and J. H. Harding. The paper was by E. J. M. Phillips, Esq., M.R.C.S., on "The forms in which Syphilitic disease is met with in the oral cavity."

In the ample discussion which followed, Messrs. Hutchenson, Gaddes, Scott, Hepburn, Bennett, and others joined.

The meeting then adjourned until the October session.

The following Publications have been Received:—

The Dental Register.
Johnston's Dental Miscellany.
Le Progrès Dentaire.
Le Progrès Médicale.
The Dental Cosmos.
The Pennsylvania Journal of Dental Science.
The Missouri Dental Journal.
Deutsche Vierteljahrsschrift.
Transactions of the Odontological Society.
Correspondenz Blatt.
Boston Journal of Chemistry.
The Dental Advertiser.
The London Medical Record.

TO CORRESPONDENTS.

All communications intended for the Editor should be addressed to the care of Messrs. Smith, Elder & Co., 15, Waterloo Place, Pall Mall.

All inquiries respecting Advertisements and Subscriptions should be sent to Mr. George Butcher, 4, Crane Court, Fleet Street, E.C.

THE MONTHLY REVIEW
OF
DENTAL SURGERY.

No. XII. MAY, 1875. Vol. III.

"THE REVIEW."

In issuing the twelfth number of the Third Volume of *The Monthly Review of Dental Surgery*, we desire to express our thanks to those gentlemen who have so ably assisted us in the production of this Journal during the past years. By our existence for three years, and the steadily increasing influence and support that we have obtained, we feel that we have shown our "right to be." In the conduct of *The Review* we have always maintained our independence; fearlessly condemning or criticising that which we considered wrong, and willingly praising that which we deemed to be right or good. In urging upon our contributors the necessity for their continued and increasing support, we would point out this very important fact, that (with the exception of our esteemed contemporary, *The British Journal of Dental Science*), there is no Dental periodical in the English language that is independent of commercial interests but *The Monthly Review of Dental Surgery*.

In the transitional state of the profession at the present time, it is above all things essential that we should be generously helped to maintain this independence, in order that necessary reforms may be instituted, where evils now exist, and that new enterprises may be urged forward without regard to vested interests, or "the masterly inactivity" of a Conservative reaction, that seems to prevail in at least one section of the Dental profession.

TOWN AND COUNTRY.

It is clearly useless to shut our eyes to evils that are around, because we fear we cannot mend them—it is far better that we should fully recognise those obstacles that hinder the progress of the profession, and do all we can to remove them. Still more mischievous is it for us to stand still in a state of sleepy contentment, and believe that we have arrived at a perfectly satisfactory, condition of things. It is a simple fact that cannot be gainsaid, that in ordinary society, in the provinces especially, a gentleman ceases almost to be considered a gentleman, if it be known that he is a dentist. And why is this? It is very largely owing to the downright apathy and isolation in which many of the provincial members of the profession live; thus retarding the progress of the whole body. They will not associate with many of their fellow practitioners because they consider themselves superior, as doubtless they are, but rather hold aloof until a better state of things permits them to meet their confreres on equal terms. It is this, more than anything that keeps back the profession in the provinces, and until it is altered we can expect no change in the estimation in which Dental surgeons are held by general society.

The Dental practitioners of the country at the present time occupy nearly the same position towards each other as the London Dentists did five-and-twenty years ago, when four of the principal practitioners of the day meeting at dinner, had to be introduced to each other, although they all lived within a radius of two or three miles of St. George's, Hanover Square. The combined action of those gentlemen has since then, revolutionized the whole profession; but the wave of social progress has sadly weakened as it has passed more and more away from the centre, and no adequate force or interest has helped on the work that commenced and is still most powerful, in London. We do not make these assertions without remembering many bright exceptions, but that in the main our statements can be borne out by evidence we are well assured. Let our country brethren combine locally for social intercourse, and professional and scientific labour. By this means we may expect results similar to those which have in some measure been obtained in London, and we shall find in a few years a Dentist able to hold the same position of respect in the provinces that a Physician or Surgeon does now. It is useless to say that we who live in town are indifferent to the condition of our fellow-practitioners in the country, it is rather that they are themselves, if not indifferent in the matter, at any rate unwilling to adopt the same measures that we have done to attain the desired end.

THE MONTH.

The Odontological Society.

The President's Conversazione.—Mr. Tomes has sent out invitations for a Conversazione to be held at the Rooms of the Odontological Society, on Thursday, June 3rd. We believe this will be the first occasion on which the members of the Dental Profession will be assembled together by the invitation of the President of the Society. For the purpose of social intercourse a soiree is infinitely better than a public dinner, and we trust the gathering may prove a great success.

Supposed Poisoning by Vulcanite.—The Committee of the Odontological Society.

The Committee appointed by the Odontological Society to investigate the question of mercurial poisoning by coloured vulcanite, will be greatly assisted by Members of the profession forwarding notes of cases which may have come under their observation. To facilitate classification, the Committee beg more particular attention to the following points. The general health, and, as far as possible, the previous history of the patient. The condition of the mouth in regard to roots or unsound teeth. A careful discrimination between mechanical and chemical injuries, the kind of rubber used, the mode of cooking or curing, and, if possible, the name of the manufacturer. All communications, unless otherwise specified, shall be treated as confidential. Any information tending to throw light on the subject, addressed to 40, Leicester Square, will be received with thanks by James Smith Turner, Honorary Secretary, Odontological Society.

The Annual Conversazione of the Pharmaceutical Society.

Invitations have been issued to a large number of members of the Dental profession for the annual gathering at South Kensington. If more than one military band could be provided it would be an advantage, as it might then be possible to induce people to move about rather than stay the whole evening in the one hall listening to the music, and making the place so hot and crowded on account of the numbers present, that to see one's friend (except through a glass case) is difficult, and to move about, simply resolves itself into a question of time and passive endurance. A band at another part of the building, that would divert a portion of the crowd of people, would therefore be an obvious advantage.

The School of Dentistry of Vienna.

This institution is the first of the kind which has ever existed in Vienna. It is peculiar in respect of the admission of pupils, as none but diplomated medical men can enter. The summer session for 1875 has just been advertised, with the names of four lecturers, and teachers of high dental reputation in Vienna. The fee is about £4 a month.

Extirpation of Parotid Gland.

This difficult operation has lately been performed without hœmorrhage by Prof. Corradi. The gland was affected with carcinoma. The separation of the gland from the styloid process, muscles, and deeper lying parts, was effected chiefly by means of a flat metallic spatula, and at certain points the galvano-caustic was employed.—*L'Imparziale*, No. 1, 1875.

Gum Lancing.

Dr. Chas. Buckingham, Prof. of Obstetrics in Harvard University, considers it in many cases highly serviceable, relieving local pain by depletion, assisting obstinate diarrhœa or constipation, and the signs of diseased brain, such as vomiting, stupor, convulsions, dilated and immovable pupil.

NEW INVENTIONS.

An Improved Celluloid Base.

Through the courtesy of Mr. Rutterford, of Poland Street, we have had an early opportunity of seeing specimens of the Improved Celluloid Base, and from our examination of two cases, (so beautifully made as to be really works of art), we feel confident that the new material will replace all others, provided only that it can be made to last for a reasonable time in the mouth. There is no smell of camphor—it is uniform in texture, natural in colour, takes a high polish, and is exceedingly light in weight. It is put into the market by S. S. White, of Philadelphia, and will, we believe, be on sale in England in the course of a few weeks.

Von Brun's Cotton Wool for Dressing Wounds.

We have received from Smale Brothers, of Great Marlborough Street, a specimen packet of Von Brun's Cotton Wool. Though somewhat harsh in texture and of short staple, it is one of the most perfect absorbents of

moisture that we have ever used. We can confidently recommend its use for all dental operations.

An Electric "Danger Bell" For Vulcanizers.

The Dental Manufacturing Company are bringing out an exceedingly clever contrivance for indicating danger from the rapid rising of the temperature in Vulcanizing. A battery is connected with the vulcanizer by a platinum wire, and upon the heat having risen to a higher degree than that desired, an Electric Bell (which may be fixed either in or away from the workroom) is set ringing and continues to ring till the temperature is reduced. We trust shortly to be in a position to give our readers further information and engravings of this cleaver application of the Electric Bell.

Nicold's Improved Soft Gold Pellets.

Having been asked to give an opinon of Nicold's Improved Soft Gold Pellets, I am pleased to say after an experience of eight or nine months, I can speak in the highest terms of the character of the gold.

Among all the varieties of foil in use, I know of none to equal this for softness and toughness, a combination of qualities which will be fully appreciated. It packs most pleasantly with the utmost ease and without fatigue. To operators in busy practice who prefer soft to hard foils, I heartily recommend a trial of it, feeling sure that it will be found a great time-saver.—Brighton, April, 1875. J. Dennant.

MR. C. S. TOMES ON DENTINE.

TO THE EDITOR OF THE "MONTHLY REVIEW OF DENTAL SURGERY."

Sir,—I have to-day seen Mr. Tomes' "Note on the Structure of Dentine," and hasten to state that I shall not be able to answer his letter in detail as I leave for Australia immediately on account of my health. I shall certainly make it my duty to reply to him and any other critic that may notice my remarks, directly I return.

Let me say that it would have shown better taste if Mr. Tomes had restricted himself to showing that my quotations were wrong, and not to insinuating anything against my researches about which he can know very little indeed, for they are not all published yet. I cannot see how the extracts from Beale's work supports Mr. Tomes' theory, to

my eyes it is opposed to it and the experiment proves nothing but what I knew already.

I quite agree with him concerning Professor Owen. I was not aware that Mr. Salter and "Reviewer" of Mr. Tomes' work in the *Review* were one and the same person.

So far as Mr. Huxley is concerned, the fact that he has not investigated the structure of dentine since Mr. Tomes' work was issued proves nothing, he certainly did not detect fibrils running to the extremities of the dentinal tubules when he did investigate, nor yet has he asserted publicly that he now believes in Mr. Tomes' theory.

Mr. Tomes' last insinuation, I need hardly say, I shall pass over without remark.

I trust that you will excuse these hurried remarks, but I have not time for further discussion, and I shall feel glad if my papers are the means of promoting a discussion upon mooted points in tooth structure.

I am, &c.

W. J. BARKAS, M.R.C.S.E., L.R.C.P.L.

Newcastle-on-Tyne, April 26, 1875.

ON A CARIOUS TOOTH.

BY W. J. BARKAS, M.R.C.S.E., L.R.C.P. Lond.

PART I.

STRUCTURE OF THE HEALTHY TISSUES.

(*Continued from page* 456.)

DENTINE *(continued)*.

III. How do the lateral branches of the dental tubules terminate?

In the extracts that I have given from the works of Professor Owen and Mr. Tomes, it will be noticed that they, to all appearance, totally disagree on this question. The former microscopist states that the lateral branches "anastomose, or terminate in the dentinal cells," and in none of his other works with which I am acquainted is there any direct observation that would lead one to infer that he believed these lateral branches inosculated with each other. The sentence I have quoted, however, might be twisted to mean that the branches both anastomosed with each other, and terminated in dentinal cells. The

latter odontologist distinctly asserts that these lateral ramuli terminate by inosculating one with another, and he does not make any reference to Professor Owen's terminal cellular hypothesis. Mr. Salter ignores this important question altogether. I have just said that this query is an important one, and it will be seen that this is so when we come to discuss the progress of caries in dentine. My researches point to the conclusion that these lateral branches only terminate by anastomosing with each other. There is not a single instance in any of my sections in which it is possible to suppose their termination in calcigerous cells, because, as we shall see directly, these cells are "non est;" but the examples of inosculation are exceedingly numerous. Fig. XIII is a section of dentine that has been taken obliquely to the course of the tubules, and near to their termination at the peripheral border of the coronal dentine, and it shows very distinctly some of the lateral branches of one tube anastomosing with those arising from an adjacent tube. Those branches that do not inosculate in this illustration, bnt apparently terminate with closed extremities, only present this appearance because of the direction in which the section was made, they have been cut through before the point of inosculation was reached. The joint cellular-looking bodies that are present are the mouths of those tubes and branches that have been severed transversely, and that are somewhat out of focus. Unless care be taken in examining these indistinct tubular orifices, it might easily be supposed that they were minute calcigerous cells; a high magnifying power, however, leaves very little room for doubt as to their true nature.

With regard to the lateral branches in the coronal dentine, it must be remembered that they are given off by the tubules very sparingly indeed in the first part of their course, but as the tubes approach near to the junction of the dentine with the enamel, they are thrown off in great abundance. As the coronal dentine blends with the dentine of the fangs, this abundant ramification approaches nearer and nearer to the pulp cavity.

IV. In what manner do the terminal branches terminate?

This point is even more important than the preceding one, because, unless we can obtain a correct knowledge of it, our ideas as to the manner in which caries first attacks the dentine, after the enamel has been partly disorganized,

must be incomplete, if not untrustworthy. The question to be decided is—Do the tubules terminate in calcigerous cells, and by anastomotic loops, as stated by Professor Owen, or by loops, and by passing into the enamel, as asserted by Mr. Tomes? In my opinion, both these microscopists are right, if the dentinal tubules of both the crown and the fang be taken for examination; but if we restrict our investigations to the coronal dentine (as it is my purpose to do as much as possible in these papers), then Mr. Tomes' assertions completely agree with what I have observed. In a tooth which is structurally normal, neither cells nor spaces can be detected either in the periphery of the coronal dentine, or in the junction itself of the dentine with the enamel, in which the tubules could terminate; but if we examine a vertical section of a whole tooth, and gradually pass down the sides of the crown until the enamel that covers the dentine is replaced by cementum, we shall find that, as the enamel begins to thin out, minute cellular bodies come to be interposed between the dentine and the enamel, and as we proceed further and further down the fang these calcigerous cells become larger and more numerous, and when the cementum is reached they form an almost continuous layer of cells. In these cells the dentinal tubules undoubtedly terminate; but this can hardly be designated as a structure found in coronal dentine. If this statement of mine be correct (as I am certain is the case), then the structure which was thought to be the seat of caries, and named "dictyodonte," is not to be found, in healthy dentine at least. This absence of a cellular termination to the tubes appears to me to have an important bearing upon the spread of caries from the enamel to the dentine, and I shall give some consideration to it in a future paper. In normal coronal dentine, therefore, the tubes terminate by forming anastomotic loops in the dentine, and by passing into the enamel, both of which methods are well illustrated in the section shown in Fig. II. The ending of the terminal branches of the dentinal tubules by anastomotic loops can be observed in almost any part of the periphery of the coronal dentine close to its junction with the enamel. By this mode of termination the whole of this portion of the dentine is in direct nutritive connection, and any diseased process being set up in one tube could be converged literally so as to undermine the whole of the enamel before they had

proceeded to any great extent into the more internal portions of the dentine. From many, if not all, of the loops in the peripheral dentine, exceedingly minute branches arise, some of which I have traced into the enamel for a short distance. These branches are so very minute that I can only resolve them clearly with the 1-16th of an inch immersion lens.

The passage of those tubules into the enamel that do not go to form anastomotic loops in the dentine is a rather peculiar circumstance and complicates our ideas as to the function of the enamel; in fact, if, as is commonly believed, we are to consider that tissue as really cut off from all sources of nourishment, which must be the case if each of its tubes are filled with a solid cylinder of calcareous salts, and thus necessarily incapable of further growth or repair, what can be the use of the dentinal tubules entering and penetrating for such a short distance into it? The "cui bono" of this structural peculiarity might possibly be capable of easy explanation if we were able to discover in what manner these tubules terminate when they are in the enamel. Mr. Tomes merely says that they proceed into the tissue and are lost there, or they become connected with, or bulge out into, elongated cavities. My researches do not clear up the difficulty at all, if anything they perhaps complicate matters further. On examining a vertical section of the crown of a healthy tooth, many of the ultimate branches of the dentinal tubes will be observed to enter into the enamel, those that do not, either form loops in the dentine, or have been cut across in making the section just before they reached the enamel, but I shewed while referring to the anastomotic loops that they also gave off branches that passed on with the enamel. I am, therefore, strongly of opinion that all the tubules pass over the line of junction between the two tissues. The distance to which these tubules penetrate varies considerably, some just enter into the tissue, while others can be traced fully one-third of the way towards the periphery of the enamel; some of them pass up between the enamel fibres, and parallel to them; others curve right across the fibres; a few wind in and out among contiguous fibres; all these tubules, however, become finer and finer as they proceed from the dentine, and ultimately they are too minute to be visible. Other tubules apparently enter into the fibres themselves, for they can be seen to suddenly

stop at the dentinal extremities of the enamel fibres; of these some appear to penetrate the parietes and others the internal columns of the fibres, but what then becomes of the tubes I cannot ascertain, because all trace is then lost of them, it may be by their having become filled with the calcareous matter that penetrates the whole of the enamel tissue, thus rendering them of a light refractive power to that of the fibres, but whatever be the destination of these terminal branches it is probable that they do proceed into the fibres, because it is not likely that they would terminate so abruptly and with such a large diameter at the orifices of these fibres. In some few cases the tubules press up between two fibres for a short distance and then bifurcate, the two branches separating and ramifying on different sides of a fibre, so that the fibre appears to be embraced by them; once or twice I have noticed adjoining tubules thus bifurcate, and the branches have crossed over the intervening fibres and anastomosed to form a loop, the tubules may evidently therefore terminate by anastomotic loops both in the dentine and in the enamel. The final mode of termination that I have shewed is the dilating of some few of the tubules directly they have crossed the line of junction or very soon after, whether these cavities are really dilatations of the tubules or cavities formed in the enamel during its development and into which the tubules now enter, I cannot say; I held the former opinion until lately, but in some of my later sections I have seen two or more tubules entering into one cavity; both suppositions may be correct, for I have also examined cavities that as they departed from the dentine contracted again into minute tubes which became gradually finer and were finally lost. These cavities are sometimes small and oval, but generally they are large, much elongated, and very irregular in outline; they sometimes lie between the fibres but more often they break right across them; granular matter is often present in their interior. These cavities were designated "angular fissures" by Prof. Owen; he does not appear to have ascertained that there was any connection between them and the dentinal tubules.

VII.* What is Owen's "dentinal cell"?

* I have altered the position of this query, as I find my original arrangement would not have allowed us to proceed smoothly from one structural character to another.

These so-called dentinal cells can be very often seen to perfection in thin vertical sections of teeth, especially of molars and bicuspids, but the section must be very fine and clear. In one of my sections they are shewn so well that I do not wonder at any microscopist being misled as to their nature if he already believed in the theory of the development of the dentine as enunciated by Professor Owen; in this example there are a dozen or more of these globular bodies lying side by side, and separated from each other only by a very narrow border of tissue of a different degree of refrangibility from that occupying the interior of the cell and the interglobular spaces; this border is evidently hard and continuous with the rest of the dentinal tissue, because the fibres generally pass through it without any alteration and always without interruption; often, however, the tubules are largely dilated, and in one case I have seen the tubules in a cell give off numerous minute branches which anastomosed with one another but they did not extend beyond the cell, nor did any of the other tubules in the neighbourhood and on the same plane give off branches. There can be no doubt, however, in the mind of anyone who has examined numerous vertical and transverse sections of dentine, that these "dentinal cells" are identical with the "globular dentine" of other odontologists. I will therefore defer further remarks for the next query as I consider that Owen's "dentinal cells" is a misnomer arising from his erroneous ideas upon the development of dentine.

VI. What is globular dentine?

The theory of the process of calcification of dentine, that I quoted from the work on "Dental Pathology and Surgery," by Mr. Salter, is probably correct, at any rate it is the only one now before the odontological world that will accord with what is known of tooth structure. I cannot add anything further to Mr. Salter's words. If this theory be granted, it is very plain that Professor Owen's dentinal cell is merely a globule of calcification in a portion of dentine that has been arrested in its development just before perfect dentine could be formed. There are one or two points, however, in Mr. Salter's statement that appear to me to be possessed with a flaw; he states that the tissue between the globules in an imperfectly developed layer of dentine remains "soft and unaltered," that the "tubules

pass indifferently through the hard and the soft tissues," and that on drying the tooth these interglobular spaces of soft tissue shrink up and leave hollow spaces filled with air which appear "opaque black by transmitted light and dead white by reflected light." Now it is very evident that the tubes running through the soft tissue will also be soft and therefore when the cartilaginous substance shrinks up on drying, the tubes ought also to shrivel or break, at any rate they should present a different appearance to those that ramify in the hard tissue, yet such is not the case, the tubes run through the black spaces just as they did before the tooth was dried, if they were dilated they are dilated still, if natural they are still natural; besides the black spaces are no more common nor any larger nor any more distinct, in a dry tooth than they are in a freshly extracted tooth, in a healthy tooth than in a tooth palpably diseased. If these facts be true, as my sections distinctly show them to be, then it is quite clear that the interglobular tissue is not so soft as stated; my impression is that it is calcified but to a different extent to, or in a different manner from, the globules themselves and therefore appears dark on account of its different degree of refraction; such apparently, is also the opinion of Professor Owen, for while speaking of the dark spaces between the so-called dentinal cells, he remarks that "the salts are sometimes blended with the blastema in these interspaces in a disgregated condition which renders them almost as opaque as the area of the tubes." In many sections that I have examined these interspaces are certainly filled with calcareous granular matter because the addition of a little dilute hydrochloric acid clears the dark area and leaves only the lines that caused Professor Owen to speak of "dentinal cells." Again, many of the dark irregular spaces only appear large on account of the thickness of the section shewing a great extent of the borders of a globule, rendering the section thinner causes the space to disappear and a "dentinal cell is apparent." The optical effects produced by these globular interspaces also tend to show that they are not filled with air, for they do not change as they ought to do on minutely altering the focus, the air spaces in the enamel change correctly enough. But the best proof I have had yet that the interspaces are truly filled with tissue, but differently calcified, is in a very thin sec-

tion that I have made through the centre of one of them; on examining it with the 1-5th and the 1-8th of an inch object glass it presented the appearance of a very irregular opening surrounded by a dark granular wall, beyond which was the ordinary dentine and the tubes apparently did not penetrate into the opening; I thought I had now received proof that these interspaces were really filled with air, but I perceived my error when I employed the 1-16th of an inch immersion lens with a hollow beam of light, the central space was filled with exceedingly clear tissue and the tubes passed straight through without change. The explanation of this section appears to be that the interspace was first calcified in the manner stated by Professor Owen, and then as development went on, a spot of true calcification made its appearance and cleared the central area before the growth of that layer was completed.

V.* What are "contour lines?"

The difference concerning these lines arises from the later odontologists adopting the expression for appearances other than those that Prof. Owen intended it, and perhaps from misapprehension of that anatomist's meaning. "Contour lines," as originally stated by Prof. Owen, are truly caused by an abrupt curvature of the tubes on a line parallel with the external surface of the tooth, they are remarkably distincly seen in tbe teeth of the fossil fish, Megalichthys (these teeth I hope to describe shortly in my papers on "The Microscopical Structure of Fossil Teeth"), they are also present in many modern fishes, and perhaps in all reptiles and mammals; in human teeth, however, they are very rarely to be observed with any distinctness, yet they are there. The "contour lines" of Mr. Salter are merely layers of imperfectly calcified dentine of variable thickness, but they are not invariably present;* the imperfection may extend throughout the whole dentinal substance, in which case there would, of course be no lines; the term therefore as applied to this structure is incorrect.

VIII. Is there a persistent developmental cell?

If the theory of the development of dentine that is now generally accepted be a true one, viz., that the tubes are formations derived from the cylindrical cells of the "membrana eboris" that is situated on the external surface of the

* See footnote on page 550.

dentinal pulp, then, *a priori*, one would naturally expect that each tubule would have its orifice closed by one of these cells during the whole of the period during which the dentine increased in thickness, a period that is synonymous with the presence of a healthy pulp in a tooth attached to the jaw of a living animal. There are one or two points, however, that militate against Mr. Salter's statement; the cells are present, of that there can be no doubt, but I should certainly not like to state that these cells were continuous with the tubes as illustrated in Fig. 3 of the above author's work, because to all appearance they are not so; nearly all the tubes in my sections commence at the internal surface of the dentine with apparently open mouths, when they project into the pulp cavity they are often dilated, and might then be considered as cells by persons imbued with *a priori* ideas; of course it may be said that the cells have been torn away during my manipulations. If persistent developmental cells really do close the mouths of tubes, then the statements of numbers of eminent microscopists that fibres extend from the external surface of the dentinal pulp into the orifices of the tubes cannot be accepted. Mr. Salter evidently does not believe in the projecting fibres and he throws them to one side by simply suggesting, not proving, that they may be minute branches of the tubes themselves, or the internal substance of the tubes hardened by chronic acid; the suggestions are of value but it does not show satisfactorily that his opponents are wrong, or that the cells are really continuous with the tubes. Professor Owen distinctly says that the tubules are open and "are always ready to receive the plasma transmitted from the capillaries remaining in the uncalcified part of the pulp." This point is well worth settling, for a correct knowledge of it would materially advance our ideas concerning the vital processes that undoubtedly go on in the dentine.

IX. Are there lacunæ-like dilatations of the tubes?

I have never been able to discover any, all the dilatations in my sections being elongated enlargements of the tubes, with a regular or an irregular outline, and extending for varying distances up the tubes. An oblique section of the coronal dentine near its junction to the enamel appears to be filled with lacunæ exceedingly similar to those found in certain fish-bones. When examined under a quarter or

fifth object-glass they are, as I hardly need to say, not dilatations, but the tubes with their branches cut obliquely.

To sum up, my researches into the structure of the dentine tends to corroborate almost all that Professor Owen has stated in the quotations that I have given from his works; in fact, about the only important point concerning which we disagree arises from our different ideas upon the method of the development and calcification of this tissue.

NEW AMALGAM INSTRUMENT.

By Mr. T. WILSON HOGUE, D.M.D., Harvard.

I have placed in the hands of the Messrs. Ash an instrument for forming amalgam into pieces suitable for introducing into cavities.

Having used it for some months and found it a very great aid, it seems to me perfect enough to give to the profession.

An appliance of this kind is desirable, as not only does the mercury soil the fingers, but by getting into the circulation through the skin, is injurious to the system.

The instrument consists of two parts; a circular stand to which is attached a rod carrying a small glass tube with a funnel-shaped mouth, a packer and spatula joined together, the latter being also a measure for determining the amount of filings required. The metal parts are of steel to resist the action of the mercury.

It is used in the following manner:—The amalgam is thoroughly mixed in a mortar: exactly the proper quantity of mercury is added to the filings, a very easy matter, and thus the necessity for squeezing out any excess is avoided. With the spatula, place in the glass funnel the amount of amalgam necessary to form a disc of the required size, press it down to the bottom of the tube, turn the circular stand, and displace the disc by thrusting the piston a little further down; this only takes a very few seconds; repeat the operation till the amalgam is finished. Should any small pieces be required, cut the disc or discs into halves or quarters with the spatula.

The amalgam need never be touched by the fingers at all.

An apology for introducing an instrument to facilitate

the use of amalgam is unnecessary. Much as we prefer gold to every other substance for filling teeh, still there are patients for whom amalgam is the most suitable material to use, and cavities which can be better filled with it than with gold.

Stourville, Bournemouth.

THE SURGERY OF THE MOUTH,

By FRANCIS MASON, F.R.C.S.,

SENIOR ASSISTANT-SURGEON AND LECTURER ON ANATOMY AT ST. THOMAS'S HOSPITAL.

(Continued from Vol. 3, p. 320.)

DISEASES OF THE BONES OF THE FACE.—(CONTINUED.)

VIII. CARIES AND NECROSIS.

In a state of health the processes of waste and repair are carried on in much the same manner in every texture of the body—I say in much the same manner because allowance must necessarily be made for certain differences in their respective physical characters. In disease, we observe a striking analogy; thus, the phenomena of caries of bone, bear a marked resemblance to ulceration in the soft tissues, and necrosis is similarly related to mortification in these parts. Caries is a gradual breaking down, or a molecular disintegration in which the vital principle is to a certain extent retained, whereas in necrosis the part dies outright. Caries chiefly attacks the cancellated structure, yet the compact tissue is often affected, and when it is involved it is, as Syme remarks, preceded by "a form of inflammation which expands, softens, and separates the dense tissue, causing it to resemble the cancellous textures in appearance." Necrosis, on the contrary, as a rule affects the harder or more compact structure. Some writers mean by caries simple ulceration of bone, and Mr. Le Gros Clark observes that in all its leading features it is identical with the ulceration of soft parts.* Others regard it as a chronic suppuration of the cancellous tissue. Stanley defines it as "the changes which under certain circumstances are consequent on chronic suppuration in the cancellous textures of bone."†

* British Medical Journal, Oct. 24, 1868, p. 443.

† Diseases of bone, p. 51.

Mr. Erichsen speaks of it as a disease characterized by increased vascularity, softening, and ultimate disintegration of the osseous tissue.* The *predisposing cause* most usually recognised is said to be a strumous condition of the constitution, the *exciting cause*, perhaps an injury—even a slight injury—of some kind. Inflammation ensues, with its varied phenomena, which ends in the breaking down and ultimate destruction of the tissue. The skin may eventually give way, leaving fistulous openings through which the small particles of disintegrated bone are evacuated. In other cases there is very little evidence of the serious disease that is going on in bones that are deeply seated, acute imflammation of the bene itself and of the neighbocring soft parts being entirely wanting. Thus scrofulous caries of the spine, for example, often advances to the destruction of the bodies of many vertebræ without tenderness in the bones, or in the soft parts investing them.† This point of want of pain is equally well marked in some cases of strumous caries in children whose fingers are so affected. There is, as a rule, considerable swelling and deformity, with perhaps more or less discharge, yet there is singularly little pain. I have now (1874) under my care at St. Thomas's Hospital a boy, aged 14, a lawyer's clerk, whose right thumb is three times the size of its fellow, and yet although it has remained in much the same condition since he was two years old, he does not remember to have had any acute pain in it.

Caries and necrosis of the bones of the face and head differ in no special manner from those diseases when met with in other parts of the body. With regard to the jaws, necrosis attacks the lower jaw more frequently than it does the upper. This may be partly accounted for by the anatomical fact that the blood supply is less free in it than in the upper jaw. Moreover if we take into account that the lower jaw is more liable to injury, and that when injured its vitality is still further diminished, we have a further explanation of the greater frequency of necrosis in this bone.

A line has been too rigidly drawn between caries and necrosis, as if the two diseases are totally distinct. Experience, however, indicates that in most cases they go hand

* Science and Art of Surgery, 5th edition, Vol. 2, p. 123.
† Stanley Op. Cit., p. 53.

in hand, and Mr. Savory gives the following excellent practical remarks on this subject.* He says that "whatever the previous signification may be which is attached to the term caries, whether it be held to be synonymous with ulceration in the widest acceptation of the term, or whether it be restricted to those forms of ulceration which are destructive of the parts involved, no fact has been more often insisted on than that the process in bone is, in its nature, identical with that which occurs in the soft parts. So with necrosis, which is simply the process of mortification in bone. Even the analogy of the process of exfoliation to that by which a slough is separated from living soft parts has for a long time been clearly recognised. Why then are these two morbid processes viewed so entirely apart? Why are these diseases made so distinct in pathology and surgery? Surely they are not naturally so separated."

And again (p. 34). "The examination of a sequestrum will of itself furnish conclusive evidence that simple necrosis must be extremely rare—that it is almost always associated with caries. How otherwise can its worm-eaten appearance be explained? How can the extensive and irregular excavations which penetrate it through and through in all directions be accounted for except by admitting this fact, that whilst large tracts of bone were destroyed by caries other portions perished more rapidly in masses, and were cast off as dead bone?" And again, Stanley observes, "Between caries and internal necrosis there are no distinctive external characters, both being followed by the formation of a fistulous channel in the wall of the bone, and both being accompanied by pain in the bone, continuing so long as the source of irritation, which is the carious or dead bone, exists. Certainly the diagnosis between caries and internal necrosis is of no moment, as the object of treatment in each is the same—the removal of the diseased or dead bone."

I shall now briefly refer to the relative liability of different bones to necrosis and caries. †Stanley gives the following order of frequency:—

1. The Tibia.
2. The Femur.

* *Lancet*, Jan. 9, 1864, p. 33, "On Caries and Its Relation to Necrosis."

† Op. Cit., p. 69.

3. The Humerus.
4. The Flat Cranial Bones.
5. The Lower Jaw.
6. The Last Phalanz of the Finger.
7. The Clavicle.
8. The Ulna.
9. The Radius.
10. The Scapula.
12. The Upper Jaw.
13. The Pelvic Bones.
14. The Sternum.
15. The Ribs.

The source of these statistics is not stated, but they are in all probability chiefly derived from Hospital practice. The tibia and femur are seen to head the list. An explanation of this circumstance may possibly be found in the fact that the lower extremity being used for locomotion, persons suffering from necrosis in this region would, by being prevented from following their occupation, be considered the most fitting recipients for in-patient hospital relief. The following statistics, however, taken from the St. Thomas' Hospital reports for the last four years, and which include *in-patients only*, tend to prove that the foot and hand are the parts most frequently affected, and I think this majority is accounted for by the disablement that disease in these important parts necessarily involves.

In the Lower Extremity.

Of diseases of the foot and ankle there were—		49	cases.
„ „ tibia		43	„
„ „ femur		35	„
Total		127	„

In the Upper Extremity.

Of diseases of the hand and wrist there were—	18	„
„ „ humerus	15	„
radius and ulna	13	„
Total	46	„
Of other parts of the body there were—		
In the skull	16	„
„ face	14	„
„ pelvis	4	„

In the patella 2 cases.
„ ribs 1 „

It appears to me that, in order to arrive at an accurate conclusion, the statistics should be taken for a certain period of all cases of caries or necrosis whether occuring in in-patients or in out-patients. Any Hospital Surgeon in charge of out-patients must be familiar with numberless cases of, so to speak, simple examples of caries and necrosis occurring in the fingers, forearm, or humerus; and also in the jaws, cranial bones, ribs, and in other parts of the body but so placed as not to interfere seriously with the patient's daily work. Of such examples we have no statistical record.

The *causes* of caries and necrosis are either local or constitutional. Thus blows, or mechanical violence of any kind; syphilis, strumous disease, and in the mouth ulcerative stomatitis, salivation, scurvy, cancrum oris &c.; the exathematous fevers, rheumatism, and the inhalation of the fumes of phosphorus too, have all been credited with starting one or other of these diseases. The following cases are selected as examples of caries and necrosis, and illustrate some of the salient points in the clinical history and treatment:—

Necrosis of jaw from decayed teeth.—A diseased condition of the teeth would naturally lead one to suppose that it must be a common exciting cause of necrosis of the upper or lower jaw, and there is no doubt that in some cases they are unmistakeably connected. Yet when we compare the relative frequency of decayed teeth and necrosis of the jaws, it is really a question whether the two diseases can with justice be very commonly associated. In the autumn (1874) I saw with my friend Mr. John Parkinson, a gentleman who had not a sound tooth in his head. He was compelled to have them all extracted, and used an artificial set with more benefit to his health. In this case there was not the slightest evidence of necrosis of the jaws. Again, carious teeth may be said to be almost universal, whereas disease of either jaw is relatively exceptional. Moreover, every Surgeon and Surgeon-Dentist, too, must have observed the extent and virulence of the inflammatory action in and around a tooth; and yet the bone itself has a perfect immunity from disease. Mr. Bryant remarks,* "that

* Guy's Hospital Reports, 1870.

necrosis of the alveolar processes is rarely the result of disease of the teeth, and when it is, it is of a very limited nature." There are, however, cases in which the disease can be traced to no other cause. Thus, Mr. George Lawson showed at the Medical Society of London a portion of the left side of the lower maxilla extending from the canine tooth to the junction of the ascending ramus with the body of the jaw. The patient, who was a young married woman, could account for it in no other way than by having had a decayed tooth.*

Necrosis after tooth extraction.—Small pieces of bone will occasionally exfoliate, or large portions may separate, after the extraction of a tooth, without reflecting in the least degree on the character or skill of the Surgeon-Dentist. Thus, Mr. Erichsen had a case at University College Hospital in which he removed from the mouth a piece of bone comprising the whole of the right ascending ramus and coronoid process of the lower jaw, with the exception of the condyle. The necrosis followed "the simple extraction of a back molar tooth."† In this, as in a case of a somewhat similar character I recently operated on, there was apparently nothing to account for the necrosis, excepting the removal of a tooth. And on this point a word is necessary. Many a skilful Surgeon-Dentist has been most unjustly condemned under such circumstances, the case being one of "post" instead of "propter hoc." Sir James Paget,‡ referring to such a case, forcibly remarks, that "Inflammation of bone and conconsequent necrosis has occasionally followed the removal of teeth; and had been most erroneously attributed to this operation. and he adds that in all probability the loosening and decay of teeth which necessitated their removal resulted from the inflammation of bone, instead of having caused it." Mr. Tomes too, puts the case in an equally forcible manner when he states, "that the conditions leading to necrosis are in the great majority of cases developed previously to the removal of the tooth. The necrosis would have been quite as sure, and perhaps even more extensive, had the tooth been left in."§

* *Lancet*, Nov. 8, 1862, p. 505.
† *Lancet*, April 6, 1861, p. 341.
‡ *Lancet*, Dec. 14, 1867, p. 735.
§ "Dental Surgery," 2nd ed., p. 498.

Direct violence applied to any part of the face will, in some instances, be followed by caries or necrosis. Thus we occasionally meet with cases in which one or both nasal bones have exfoliated after injury; and in instances of fracture of the lower jaw portions of bone of various sizes will be cast off. Sometimes the operation known to Surgeon-Dentists as "pivoting" sets up such intense inflammation that the surrounding bone undergoes caries or necrosis. A case of this kind came under my observation * not long ago.

Necrosis from Tobacco Oil.—Irritants applied immediately to a tooth have produced most disastrous effects. Sir James Paget had under observation a case of necrosis of the lower jaw, resulting from the introduction of tobacco oil into the hollow of a bad tooth. The man, who was a sailor, had some months before put the oil from his pipe into the tooth to relieve toothache. Great pain and violent inflammation followed thereupon, ending in death of the bone. Several sequestra were removed.†

Necrosis from profuse salivation.—An interesting case of this kind, which I well remember, was under the care of Mr. Bowman at King's College Hospital in 1857. The patient, a man aged 31, was employed in some gas-works, and was exposed to great alternations of temperature. Fourteen years before he sought advice he received a severe blow on his left cheek, and five years ago, having in the meantime contracted syphilis, for which he was profusely salivated, he first felt pains in the left cheek, which he described as being very severe, and preventing him from sleeping at night. On admission, all the teeth on the lower jaw, with the exception of the last two molars on the right side, were loose, and matter oozed up from their sockets. The loose teeth were first removed, and subsequently the whole symphysis and horizontal rami as far as the molar teeth, the mental foramina on both sides sides being included.‡

Necrosis from syphilis.—Syphilis is said to be a common cause of necrosis especially in the upper jaw. A severe case of this kind was under the care of Mr. Erichsen. There was ulceration of the palate, and destruction of the sphenoid

* *Month. Rev. Dental Surgery*," Oct. 1874, p. 219.

† *Lancet*, June 23, 1866, p. 684.

‡ *Lancet*, Nov. 28, 1857, p. 550.

bone. Mr. Erichsen removed two pieces of bone through the opening in the palate. The layer consisted of the whole body of the sphenoid and the roots of the pterygoid processes, including the vidian canal, on each side. It had the sella turcica, and the grooves for the carotid, well-marked. The patient made a good recovery.* And Dr. Gibb brought before the Pathological Society on November 1, 1864, a specimen of necrosis of the turbinated ated bones, and the whole of the vomer which had been expelled from the posterior nares by a gentleman, aged 45. The history was syphilitic.

Purpura hæmorrhagica following syphilitic caries of the bones of the nose.—Mr Henry Lee has reported such a case.† The patient was a gentleman who had rupial sores on different parts of his body. When they were better, he had severe pains in the elbows, knees, and wrists. He bled profusely from the nostrils, and spots of purpura appeared all over the body. He passed bloody urine, and died. At the post-mortem, the bones at the back of the nose were extensively diseased, and the intestines were studded with spots of purpura.

In these cases the history was, doubtless, clearly made out, but there are many instances in which the Surgeon is apt to be misled as to their real nature. In syphilitic necrosis, the palate and superior maxillary bones are said to be the victims, yet I have notes of numberless cases in which these bones have been implicated, and in which I have failed entirely to make out a history that the system had been previously infected. In questioning a patient, it is important to remember to ask him if he has had, (in addition to any local disease, spots on the body,) for a lengthened period or a persistent sore throat, and to enquire if he has lost his hair, or had psoriasis in the palms of his hands. I need scarcely add, that the true infecting sore—*i.e.*, the sore that infects the system—is, as a rule, a simple-looking affair, if contrasted with the local suppurating sore, and the former being seldom accompanied by suppuration in the inguinal glands, leads the patient to think lightly of his case. He refers to it probably as a "little hardness only." On the other hand, let him have the

* *Med. Times and Gaz.*, Jan. 4, 1873, p. 7.
† *Brit. Med. Journal*, March 18, 1866, p. 266.

local manifestations, or suppurating sores, and suppuration in the inguinal region, and he will, probably, regard his case as hopelessly incurable. The fact is, as every surgeon knows, that the more simple-looking sore (the infecting sore) is far worse, so far as the constitution is concerned, than the local or suppurating sores. It may be truly said of the infecting sore, that in many instances it "looks the flower, but it is the serpent beneath."

This is not the place to enter into a discussion on this very important and interesting subject, but it should be borne in mind :—

1st. That if a patient admits having had syphilis, he may in reality have suffered from the local or suppurating variety *only*, which is not followed by constitutional symptoms.

2nd. That if he denies having had syphilis, he may still have had recently an infecting sore, or that variety which, as a rule, is followed by constitutional symptoms, and which may not as yet have manifested themselves.

3rd. That if there be any well-marked cicatrices on the genitals, or in the inguinal region, the Surgeon may *suspect* that the disease has been of a purely local character, and that the patient in all probability has not, and will not have, constitutional symptoms.

(*To be continued*).

LONDON DENTAL HOSPITAL, LEICESTER SQUARE.

A List of cases Treated at the Dental Hospital during the month of April.

The first was that of a man who applied here for the extraction of a tooth ; it was removed, and he was dismissed in the usual way without any alarming symptoms presenting themselves, however, for twenty-four hours, he had profuse hemorrhage, the following morning he came to have it arrested. On examination it was then bleeding freely, the cavity was mopped out, a piece of lint wrapped up in the form of a cone, and size of the cavity, and saturated with the Tr-ferri perchloridi, was packed thoroughly down the socket, then a pad or two of lint on the top of it, ordered him to shut his mouth, and then put on a bandage. This was not removed for two hours, which entirely stopped it.

2. This was a case of trismus, caused by an impacted lower dens sapientiæ. The patient was a woman, who had been under medical treatment for six weeks, where *poulticing* had been strongly advised at the angle of the jaw. The patient could only open her mouth about half-an-inch, however, the wisdom tooth was removed, and she rapidly recovered.

3. This was a case of a man aged 60, whose gums had receded to a great extent. Patient had syphilis four years since, and had undergone mercurial treatment, several of the teeth were loose, and as he was still under medical treatment, he was merely advised to use the following mouth wash two or three times a day :

℞ Potassæ Chlor. ʒj.
Liq. Potassæ Permang. ʒij.
Tr. Myrrhœ ʒiv.
Decoc. Cinchonœ, ad ℥viii.
Misce fiat Lotio pro ore, bis vel ter die utend.

4. This was a case of pivoting the right upper central, which was followed with great pain and swelling, extending from the apex of the tooth to the cheek, and implicating the eye with impairment of vision. On observing that the symptoms of amaurosis became more serious, upon the combined opinion of the staff it was proposed to remove the stump. Nitrous oxide was administered, when it was carefully extracted, and from that time the swelling abated, the pain diminished, and the patient gradually recovered.

5. This was a singular case of a vocalist whilst engaged with his troupe some ten years since, in India, that whilst taking an exciting part which rather compelled him to open his mouth as widely as possible, he all at once (as he described it) had something in the left region of the articulation of the jaw—go bang!

This patient asserts that from that period to the present he daily experiences most excruciating pain, coming on more particularly whilst filling his vocation. He was recommended to rub in at bedtime, every night, at the articulation of the jaw an anodyne liniment, composed of :

Lin Belladonnœ ℥ij.
Lin Saponis ℥j.
Misce.

This relieved him considerably.

6. These were different cases of abscess of the antrum, which progressed favourably under the following treatment, viz., injections of

Liquor Potassœ Permang ʒ ij.
Vinum opii. ʒj.
Aqua ad ℥ vj.

To be used with an equal quantity of luke warm water daily; or,

℞ acidi Carbolici ♏ x
Glycerini ʒj.
Tr opii. ʒj.
Aqua ad ℥ x.
Misce fiat Injectio.

To be used as the former ; substituting in a more advanced stage,

℞, Zinci Sulph ℈j.
Vinum opii. ʒj.
Aqua ℥ jv.
Misce fiat Injectio.

To be used as the others. This, combined with especial attention to the antiphlogistic and constitutional treatment, the patients did well.

Should you have space in your journal the above may be interesting to *some* of your readers.

I am, truly yours,

James Merson,
House Surgeon.

CORRESPONDENCE.

From our American Correspondent.

New York, *February*, 1875.

In fulfilment of my promise, made long ago, I am moved to send you another letter of "chat" about our local matters, our laws, and our societies, and such other matters as may present themselves as I write.

Before speaking of our more intimate concerns, let me allude once more to Mr. Turner's letters of two years ago, and their reception in this country.

There is no doubt that what Mr. Turner wrote was true, and the majority of our best practitioners were glad to see so searching a criticism on our system of Dental education, but it is equally true that he did not tell all about any of the American schools, either for good or evil. For example, in speaking of our colleges generally he made no mention of the Maryland Dental college, of which Dr. Gunning, of New York, was President of the board of Regents, and from which position he has thought it needful to withdraw, resigning all connection with the college because of his disappointment that its course was *not* steadily forward. (see *Missouri Journal*, for March 1875, p. 109.)

Neither does he speak of some of the reasons that may hav been strongly operative with students from abroad to induce them to pay the compliment to Philadelphia of graduating there, such as—the possibility of earning enough to pay their way while in the school, by waylaying infirmary patients and operating for them privately—in other words running an opposition establishment to the college infirmary during term time, and as a punishment, having the rules read to them, but afterward receiving their diplomas.

Nor does he figure up the receipts and expenses of a dental college with 100 students or so, to shew that a dental school, well established, may be a piece of property too valuable to be rashly tampered with, in the way of raising the standard of graduation to such a point that students will not come to it.

Again, in speaking of the New York school, he did not say, and perhaps did not know, that in 1867 two years only after the founding of this school, nine or ten practitioners of New York city and Brooklyn, went to Philadelphia and took their diplomas from the Pennsylvania college, instead of graduating at the school in their own city. Neither did he say that quite a number of the students in the Philadelphia schools are every year from New York. There must be a reason for this, and perhaps if that reason were sought it might clear up Mr. Turner's "surprise" at finding the New York college such as it is, while such ample materials for teachers can be found practising in this city. The sympathy and active support that one would naturally suppose ought to exist between the members of the profession in New York and the college located there is lacking; indeed, there is all too little of that active sympathy of the rank and file of the profession with any educational influences whatever; not one third of them take a dental journal even, if the statistics on that point can be believed.

Now, on the other hand, all candid observers must admit that the system of dental teaching in America, such as it has been even, has contributed not a little toward giving the profession the standing which it now enjoys before the public. To stop there would not be like the "Yankee nation,"—and if John Bull has organized a better and more efficient Dental school than has existed hitherto, he may expect Brother Jonathan over there to take notes and look around and try to do a little better.

Our world moves as well as the great world, but sometimes it gets a backward turn which the other doesn't. In illustration of this an inci-

dent may now be mentioned which it would hardly have been proper to speak of before the death of Dr. Parmley.

It will be remembered that at one time he was President of the New York college of Dentistry. Associated with him in that institution were Dr. Dunning, Dr. Lord, Dr. Allen, Dr. Geo. E. Hawes, and others, whose reputations had been established for many years, along with some younger men who were not at that time as well known as they now are by a good deal. In 186—, the College of Physicians and Surgeons asked the Dental profession, through certain of their number, whether they would give their moral support to the movement if the college of Surgeons would appoint a corps of Dental instructors. To this question which was put in writing, seventy or eighty, comprising all the best dentists in the city, gave an unqualified affirmative by appending their signatures to the paper. Certain scheming ones at the same time saw that it would be a very good thing if the New York College of Dentistry, all organized as it was with its corps of instructors, having already some experience, could be directly united with the College of Surgeons. Unfortunately for the movement those who held chairs that would still remain in existence after the consummation of such a union were the first to perceive and adopt the idea, while those whose professorships would necessarily be annulled by this union, failed entirely to see the advantages of it. Those having a clear perception of the facts then undertook to engineer their ideas through privately, instead of making it a popular movement among the profession. The adhesion of Dr. Parmley, Dr. Geo. E. Hawes, (both since dead) and a few others was obtained to the movement.

Dr. Parmley, who died worth a million and a half, had expressed his intention of either endowing the school, or of putting it in possession of a building immediately opposite the College of Surgeons, which is to-day worth probably fifty thousand dollars or upwards. As before stated, however, the effort was made to carry this plan through privately, and it failed. Dr. Parmley retired from the presidency, Dr. Lord, Dr. Dunning, and Dr. Hawes withdrew their active support, and the College fell into the hands in which it now remains. Not long afterwards Dr. Kingsley procured an injunction against it for alleged irregularities, and closed the concern up for a number of months. For some reason or other, Dr. Kingsley did not have the active sympathy of the whole profession in this proceeding, which he was led to expect, and they failed to sustain him, indeed showed entire apathy in the matter, so, finally, he abandoned the thankless task, and allowed the injunction to fall; upon

the receipt by him, from the trustees, of an agreement exempting him from all liabilities because of his action in the matter, and upon their assuming the payment of the legal expences incurred in closing up their own institution. From that time to this it has been extremely difficult to obtain any accurate information in regard to the inner workings of the college.

The State appropriation which had been given it as a charitable institution because of its infirmary, has stopped, and since then, except for the fact that it has a charter, it might as well have been a private school. It does not enjoy the confidence of the profession at large, although it is probably better conducted now than it was three or four years ago. Some of its own alumni have remonstrated with its present officers in regard to their course, and have endeavoured to persuade them to change it for the better; what the ultimate results of their efforts may be, the future only will show. One thing in their announcements looks very badly—every member of the faculty is also on the board of trustees, a condition of things without a parallel in any of the other dental colleges in this country which pretend to be public institutions.

But to turn now to another educator of a positive kind. The New York Odontological Society is quite a small society, but its members have a way of holding very pleasant meetings at each other's houses, and inviting as guests whom they choose, so that the company changes somewhat from month to month. This society held a meeting in December last, beginning on Monday evening and ending on Wednesday noon; two evenings were passed, in a social as well as business way, at the houses of two of the members, and the day sessions were held in a Church parlour. Their proceedings have just been published in book form, and those who may be fortunate enough to receive a copy may congratulate themselves on possessing the record of the best dental meeting that has probably ever been held in America, certainly during this generation. The stronger men of the profession were present in considerable numbers, and the interest was so great, and the signs of progress so evident, that the Harvard Dental School almost immediately felt themselves justified in taking the following action:—

COURSE OF INSTRUCTION IN THE HARVARD DENTAL SCHOOL.

From and after September 28, 1876, instruction will be given in the Harvard Dental School by lectures, recitations, clinical teaching and practical exercises, uniformly distributed throughout the academic year, and the distinction of winter and summer sessions will thereafter be

abolished. The year begins on the Thursday following the last Wednesday in September and ends on the last Wednesday in June. It is divided into equal terms, with a recess of one week between them. There is also a recess of one week at Christmas. The course of instruction is progressive, extending over two years.

EXAMINATIONS.

The regular examinations are held in the following order, viz.: At the end of the first year, anatomy, including dissective physiology and general chemistry. A certificate from the demonstrator of anatomy will be required of each student, that he has satisfactorily dissected the three parts of the body. At the end of the second year, dental pathology, including a knowledge of gestation and diseases of women so far as they affect the mouth and throat, dental materia medica and therapeutics, oral surgery, and surgical pathology, operative and mechanical dentistry. The examinations in operative and mechanical dentistry include actual operations and the preparation of specimens of mechanical dentistry.

REQUISITIONS FOR THE DEGREE.

Every candidate must be twenty-one years of age, and of good moral character; he must give evidence of having studied medicine or dentistry three full years; he must have spent at least one continuous year at this school, have presented a satisfactory thesis and have passed all the required examinations. Students may be admitted to advanced standing upon passing a satisfactory examination in a majority of the studies already pursued by the class; but no student shall advance with his class or be admitted to advanced standing until he has passed such examination. The work in the operative and mechanical infirmaries will go on throughout the course, but no student shall be permitted to operate at the chair until he has by observation and practice on extracted teeth satisfied the Professor of his fitness. The faculty recommend young men who propose to take the degree to spend the whole of the required term of three years of study in the school. But those who wish to spend but two of the three years in the school are earnestly advised to pass their first year of study, before entering, under the direction of a *competent* private instructor.

FEES.

There shall be no fees for matriculation, for the diploma, nor for the demonstrators. For the first year a student is a member of the school, the fee shall be 200 dollars; for the second year, 150 dollars; for any subsequent year, 50 dollars. Students may enter under either the old or

the new plan, at their option, in September, 1875, but no degree will be given under the old plan after February, 1877.

It would seem not a very difficult task for the Odontological Society to draw to itself all the best men of the country, and indeed, perhaps in England also, continue to draw out the best talent it can find, cause its proceedings to take a monthly or a quarterly form, and thus secure an independent journal not only, but an organized body of the best men, so strong, that they could establish a proper standard of professional culture and speedily cause dentistry to assume its proper position as a speciality in medicine.

Advances are being made here in all the appliances likewise. Electric mallets are being so improved that they promise now to become as necessary as the dental engine, and by the way, S. S. White has made a notable improvement lately in his engine, which, heretofore, was only fit to run the smaller instruments, but vibrated too much for a large burr or a corundum disk. He has now adopted a cable with the outside wires twisted around it in opposite directions like a piano string, so that one tightens as much as the other untwists; this compensating arrangement allows the use of the largest disks with a steadiness heretofore entirely unknown in that engine. As much as it is improved, by so much it cuts in on the Morrison, and there are "rumours of wars" flying thick just now; suits for infringements being very strongly hinted at. We shall see what time may bring forth, but we being outsiders may hope that we shall share the spoils in the continued improvement of our appliances.

But my letter is already too long, so for now I'll end it.

POISONING FROM CORROSIVE SUBLIMATE GENERATED IN THE MOUTH FROM AMALGAM PLUGS IN THE TEETH.

HAVING been invited by an eminent gentleman of the medical profession to attend a convention of the State Medical Society to submit to its consideration a matter of vital importance to the human family, and being unable to comply with the invitation, I have written this article to lay the matter before the medical profession and ask its co-operation.

The matter which I wish to bring to the notice of the profession is the poisoning of thousands of people all over the world from corrosive sublimate generated in the mouth from amalgam plugs in the teeth. Neither Asiatic cholera, nor small-pox, nor any malarious disease, is doing half the mischief in the world that is being done by this poisoning. Every medical man of any considerable practice has undoubtedly had numerous cases of it, but never knew what it was. The symptoms are so numerous

and varied in different cases that it would be impossible to give them all in this short article, but I will say that a person poisoned in this way is liable to be treated for dyspepsia, neuralgia, paralysis, consumption, and numerous throat diseases. The patient gradually wastes away as if going into a decline, and no medicine will afford any relief. In many cases the difficulty steals on so gently as not to excite the least alarm, and continues very gradually for a number of years till the patient becomes a total wreck; while in others the attack comes on violently, and the friends and the attending physician think the patient is dying; but he will again rally, and again be prostrated.

There is such a resemblance in the symptoms to nearly all the diseases to which human flesh is heir that the physician is lead to treat the patient for some disease which seems to be a very clear case, but his patient gets worse. In more than twenty cases that I have had, nearly all had been pronounced by some physician as having consumption. In nearly all the cases there are at times a very bad cough, eyes sunken, and haggard expression and deep blue or dark color under the eyes, invariably a metallic taste in the mouth, water flowing from the mouth in the night while asleep so as to wet the pillow, and in most cases extreme prostration.

I have not time now to detail the manner in which the corrosive sublimate is formed in the mouth, further than to say that the quicksilver in the plugs is driven off by the heat of the mouth in very minute particles, and combining with the fluids of the mouth, or any saline substance, such as our food, passes into the stomach and produces slow poisoning. If the State Medical Society will appoint a committee to visit this place, I will show them several cases that will place the matter beyond controversy.

There are some twelve thousand dentists in the United States, doing a wholesale business in this poisoning, and I ask the co-operation of the State Medical Society, as guardians of the public health, to assist in getting an act of Congress passed making it a penitentiary offence to place any poisonous substance in teeth that will injure people.—*J. Payne, D.D.S., Chicago Med. Journal.*

"TO BE, OR NOT TO BE."

HAMLET. Act III. Scene 1.

To have it out, or not, that is the question:—
Whether 'tis better for the jaws, to suffer
The pains and torments of an aching tooth;
Or to take steel against a host of troubles,
And, by extracting, end them?—To pull,—to try,—
No more;—and, by a try, to say we end
The toothache, and a thousand natural ills,
The jaw is heir to,—'tis a consummation
Devoutly to be wish'd. To pull;—to try;—
To try! perchance to break; ay, there's the rub;
For in that wrench what agonies may come,
When we have half dislodged the stubborn foe,

Must give us pause: there's the respect, that
Makes an aching tooth of so long life:
For who would bear the whips and racks of pain,
The old wife's nostrum, the dentist's contumely,
The pangs of hope deferred, kind sleeps delayed,
The insolence of pity, and the spurns,
That patient sickness of the healthy takes,
When he himself might his quietus make
For one small guinea? who would fardels bear,
To groan and fret under a weary pain;
But that the dread of something lodged within,—
The linen covered forceps from whose fangs
No jaw at ease returns,—puzzles the will;
And makes us rather bear these ills we have,
Than fly to others that we know not of?
Thus dentists do make cowards of us all;
And thus the native hue of resolution
Is sicklied o'er with the pale cast of fear;
And many a one with boldness seeks the door,
With this regard, but turns his steps away,
Scared at the name of—ROBINSON.

DENTAL PATENTS.

[*The Dental Advertiser*].

[*Under this head we publish, as items of news, the names and claims of all patents relating to Dentistry, issued for the quarter preceding the publication of this Journal.*]

154,632—September 1, 1874.—BLOW PIPES.—Fernanda L. Barber and Orrin J. Price, Oxford, Mich.

A vessel is divided into two compartments. From the upper one extends the wick-tube, so arranged as to bring the flame beneath the lower compartment and in proximity to the blow-pipe, which conducts the vapour from the lower compartment to the flame.

Claim.—A blow-pipe, wherein the vessel A, divided into two compartments by the diaphragm B, the pipe C, having a sleeve *c*, leading out of lower compartment, are, respectively, constructed and arranged substantially as described and shown.

154,867—September 8, 1874.—TEETH-SEPARATING APPARATUS.—Oliver A. Jarvis, New York, assignor to Algernon K. Johnson, Brooklyn, N. Y.

Two metal arms, with wedge-shaped points, are forced, by means of a spreading set-screw, to enter between adjacent teeth, and thus force

them apart in readiness for filling. These arms have also holes for the insertion of dental tools while the apparatus is in place.

Claim.—1. An instrument for separating teeth in the mouth, the same consisting of two arms, provided with one or more wedge-shaped points, to be forced between adjacent teeth, or with points to bear against them, and a screw for operating said points, substantially as described.

2. An instrument for separating teeth, consisting of two arms united at one end, with a screw for operating them, and having their free ends provided with points for engaging with adjoining teeth, and with recesses, notches, or holes, for the insertion of dental tools while the implement is in place, substantially as described.

ODONTOLOGICAL SOCIETY OF GREAT BRITAIN.

Ordinary Monthly Meeting, May 3rd, 1875.

The President, J. Tomes, Esq., F.R.S., in the Chair.

The President announced, as a painful duty, the death of his predecessor, Mr. Sercombe. Most of those present were personally acquainted with the deceased, and they would all agree that he was a man of great value to the profession; a man of upright bearing, strong feeling, and so strong a love for truth, that on no occasion did he fail to denounce that which he thought untrue, and to uphold that which he thought to be just. He was especially valuable in the present stage of the profession on account of the very high standard which he set apart for himself with regard to professional duties. He recognised thoroughly that professional truth, that not only competence but excellence was an absolute duty on the part of professional men; that nothing excused any shortcomings in the discharge of those duties which were entrusted to him by his patients more ignorant than himself in the subject of dental surgery. The President felt that he could hardly do justice to such a character as Mr. Sercombe's, and could not fully appreciate his excellence. At the present stage of professional history the loss of such a man was a very great loss; his example to young men and his encouragement to young men was one of the highest order. He might at times be said, perhaps, to be outspoken, but if it were so, it was always on the right side as he believed—and everyone was sometimes liable to error—it was always in the cause of truth and justice.

Mr. Saunders proposed, and Mr. J. Parkinson seconded

a motion, that a letter of condolence be sent by the secretary in the name of the society, expressive of their sympathy with Mrs. Sercombe in her bereavement.

The resolution was unanimously carried.

Mr. ELLIOT submitted to the meeting two teeth which, he said, had peculiarities about them sufficient to make them objects of interest. The lady to whom they belonged had consulted him and complained of uneasiness rather than of pain; her face was swollen and the interior molar in the left upper jaw decayed and somewhat loose; and by the side of it and behind it, the stump of the second molar was deeply imbedded in the gum, which was inflamed and very much swollen. He removed it and the stump came away with it. There was nothing particular in the condition of the mouth, and there was no disease of the antrum, and in a week's time the swelling had subsided and the gum was healed as after an ordinary operation. Upon examining the tooth it was found that the fangs were united by hypertrophied cementum; they were so firmly united that the fangs would have been dislocated before the connection of one of them would have given way. Until within a few days of consulting him, the lady had never experienced any uneasiness from the presence of the tooth in her mouth, and he, therefore, concluded that the alteration in structure—the absorption of the alveolus and the hypertrophied cementum was due to long-continued sub-acute irritation, no doubt brought on by the presence of the stump of the decayed tooth.

Dr. THAYER then read a paper describing a new dental base, which he had invented, which he called Coraline from its beautiful appearance. It had the advantage over pink and other rubbers of being stronger, lighter, and more elastic; and its colour could be made to imitate any shade of the gums or mucous membrane to the greatest nicety. The colour would never fade and the material being elastic did not shrink. A set of teeth could be made in less time with this material than any other substance; three to four hours sufficing from the taking of the impression to the time of final delivery to the patient. It also took a high degree of polish. The apparatus used in its manufacture were simple and cheap, only costing 30s. It had also other commendatory properties. He was inclined to think

that if it were brought into use, the profits accruing to the profession would be materially enlarged, and the great expense attending the apparatus at present in use would be diminished.

The PRESIDENT said that Dr. Thayer had brought before the Society a material, but he had not shown of what it was compounded.

Mr. COLES asked in what respect the base in question differed from the ordinary celluloid base or from the gutta percha used in a vulcanised form in America.

Mr. THAYER said it differed from it by not shrinking.

Mr. COLES said he should like to know how it differed in composition.

Dr. THAYER said that the composition would be made known at some future time.

Mr. COLEMAN thought that the subject should at some future time be brought forward in a paper to allow the members an opportunity of discussing it.

Mr. TURNER said he had advised the inventor to take out a patent for his invention, and then bring it before the Society, but Dr. Thayer was anxious to bring the material under the notice of the profession now, as he expected his colleague shortly from America who would read a paper giving the details of the material, its mode of manipulation and other matters.

Mr. CATLIN did not think that the Society should be made the medium of advertising patent inventions, as it would very much lessen the respect in which the Society was held. He thought a committee should have been appointed to investigate the merits of the invention before it was brought before the Society at all.

Mr. WALKER exhibited a model of the mouth of a patient 75 years of age, who, two years ago erupted a wisdom tooth, which gave pain, restlessness, and sleeplessness. After enduring it for six weeks, the tooth was extracted and a cure was effected. She again presented herself with the right wisdom tooth cutting through. He thought the case peculiar from the great age of the patient. He also gave three cases which came under his notice, of symptoms of mineral poisoning, arising from the use of red vulcanite rubbers. On removing the red rubber plates and substituting gold plates, the symptoms disappeared. These causes had led to his discontinuing the use of red rubber

for the past six years and a half, and he had used black rubber in its stead, finding no difficulty in persuading the patients to use it when he told them that it was pure, and that the rubber in its red condition had in it some chemical colouring.

Mr. COLES thought that patients having a scanty supply of saliva might have that supply arrested for a time by the insertion of a mechanical appliance. In cases where he found irritation arising from the want of secretion of saliva in the mucous membrane, he gave the patient relief by painting over the surface of the plate and the mucous membrane with a solution of carbolic acid and glycerine, which stimulated the mucous membrane, and got rid of the friction and dry surface. Another reason why the red rubber would irritate was, that it to some extent absorbed the moisture more than the black rubber, which was much denser in structure than most red rubbers, and this might account to some extent for the tongue being implicated.

MR. WALKER said he had found impure gold plates producing dryness of the mouth and arresting the secretion of the saliva.

Mr. CATLIN believed the present subject would open a new field for consideration. Before the bad consequences were attributed to vulcanite, the mode in which the patient had been treated medically should be known.

Mr. TURNER then read a paper by Mr. J. E. Rose, of Liverpool, entitled "Remarks upon Hall's Suction-Valve."

Mr. COLES after the reading of the paper, said that he had spoken very favourably of the rubber discs when they were brought forward, but he thought it only right to allude to certain failures. In one case it had been most marked owing to the way in which the rubber had swelled. The discs ought to be made of vulcanized instead of unvulcanized rubber.

In answer to Mr. Turner, Mr. COLES said that discs could be made of elastic vulcanized rubber. Vulcanized rubber did not swell as was the case with unvulcanized rubber.

The PRESIDENT asked how long vulcanite rubber would last, if used as suggested by Mr. Coles.

Mr. COLES said it would last from three months to three or four years, according to the nature of the saliva in the

mouth of the patient, and the care with which it was kept.

Mr. ALFRED COLEMAN then read a paper on "Matters pertaining to the Practice of Dental Surgery in Egypt."

At the conclusion of the paper, Mr. COLEMAN made an interesting digression, and described his entertainment at an Arabian feast as illustrative to some extent of the mode of life of the Bedouin Arabs. Having described his hospitable reception in some detail, he concluded by observing that the Bedouin Arabs were a fine class of men enjoying excellent health, and that they had splendid teeth. They were total abstainers not merely from alcoholic fluids, but also from the knife and fork; but they were hardly so well acquainted with the use of the tooth brush as were the people of this country, still they adopted the practice of frequently washing their mouths.

Mr. MUMMERY felt that the Society was greatly indebted to Mr. Coleman for his graphic description of his adventures in Egypt; but more especially his having so thoroughly worked out as the opportunity presented itself, the question of the presence of stoppings in the teeth of the ancient Egyptians. When preparing the materials for a paper to be read before the Society some years ago he (Mr. Mummery) had pressed Mr. Benomi on the subject, but was told by that gentlemen that although he had lived among the tombs for many years, he had never met with an instance of the stopping of teeth; and he had examined thousands of skulls at a time when they were much more easily to be obtained than at the present day. Mr. Benomi had never had the slightest reason to believe that gold, lead, or anything else had been used for the purpose of stopping the teeth of the ancient Egyptians. He (Mr. Mummery) thought the circumstance was unique, and was probably to be attributed to the gilding of the face and teeth which was to be seen in mummies. The author of the paper had thrown an amonnt of light upon the subject that had not been previously brought to bear upon it, for the reason that he was more qualified by his previous training to investigate the question.

Mr. BARRETT suggested that as spices, gums, and other things were placed in the mouth of mummies, and as when hardened they produced a coating over the teeth, filling up the spaces and interstices, it might give the impression

that frames had been employed by the Egyptians in the mouth.

The PRESIDENT thanked the authors of the papers which had been contributed, and alluded particularly to Mr. Coleman's valuable communication.

LIVERPOOL DENTAL HOSPITAL, RUSSELL STREET,

Annual Meeting and Report.

The Annual Meeting of the subscribers and friends of this institution was held on Tuesday, February 16th, in the Mayor's parlour, at the Town Hall, Liverpool. The Mayor, Lieut.-Col. Steble, presided.

Mr. W. J. NEWMAN, having been called upon by the Mayor, read the Fourteenth Annual Report, which was as folllows:—"In presenting to their subscribers and the public the Fourteenth Annual Report, the Committee of the Liverpool Dental Hospital, desire to record their continued satisfaction with the working and success of the Institution. Having outlived the period of probation and uncertainty, this valuable Charity has become one of the recognised and established beneficent organisations of the town. The constantly increasing demand upon its resources, evidencing as this does the substantial character of the relief it affords, is a sufficient guarantee that the Dental Hospital is not only a necessary, but a very important agency in the great Christian enterprise of ministering relief to the suffering poor. With this conviction impressed on their minds, your Committee desire to submit to their friends that the time has fully arrived when the Institution should be more thoroughly consolidated. The first step towards this end,—viz: the purchase or erection of a building adequate to our requirements,—has been in contemplation for some time; but lack of funds, and inability to decide upon a suitable building, have hitherto prevented the Committee from proceeding to a more practical issue. With very great earnestness they would urge this matter upon the attentive consideration of their kind supporters, feeling sure that the necessity once recognised by the public, these difficulties will be soon removed. On reference to the Report of the Dental Surgeons, it will be seen that during the year no fewer than 5,463 patients have been admitted, and 7,422 operations performed. The Treasurer's Report is also submitted, and shows a balance of £3 13s. 8d. due him on the General Account, and the sum of £163 0s. 7d. in the bank on New Building Account. Thanking the subscribers for their sympathy and support during another year, the Committee would express the wish that their next Report will indicate at least the commencement of their long-cherished scheme, for extending and rendering still more beneficial this highly valuable charity."

Mr. DAVID CAMPBELL read the statement of accounts. It showed that the balance in hand on the 31st December, 1873, amounted to £3 9s. 11d.; the subscriptions during 1874 had amounted to £64 5s. 6d.; the Hospital Sunday Fund, £54; and the Patients' contributions, £15 3s. 8d. The expenditure included the following items:—Rent of Hospital £32;

house expenses, coals, gas, water, &c., £13 10s. 1d.; advertising, printing, books, &c., £11 13s.; stamps, staticnery, &c., £4 8s. 2d.; Assistant Dental Surgeon, £25; hospital supplies, fixtures, &c., £54 1s. 6d.; and there was a balance due the Treasurer of £3 13 8d. There was a sum of £163 0s. 7d. in bank on the New Hospital account.

The Report was then formally adopted and after some discussion as to the future of the Hospital and passing votes of thanks to the officers of the Institution the meeting separated.

LONDON DENTAL HOSPITAL.

CASES TREATED FROM APRIL 1ST TO APRIL 30TH, 1875.

Extractions. Children under 14	431
Adults	514
Under Nitrous Oxide	273
Gold Stoppings	155
White Foil ditto	30
Plastic ditto	177
Irregularities of the Teeth treated surgically and mechanically	63
Miscellaneous Cases	273
Advice Cases	87
Total	2003

JAMES MERSON, *Dental House Surgeon.*

The following Publications have been Received:—

The Dental Register.
Johnston's Dental Miscellany.
Le Progrès Dentaire.
Le Progrès Médicale.
The Dental Cosmos.
The Pennsylvania Journal of Dental Science.
The Missouri Dental Journal.
Deutsche Vierteljahrsschrift.
Transactions of the Odontological Society.
Correspondenz Blatt.
Boston Journal of Chemistry.
The Dental Advertiser.
The London Medical Record.

TO CORRESPONDENTS.

ALL communications intended for the Editor should be addressed to the care of Messrs. SMITH, ELDER & CO., 15, Waterloo Place, Pall Mall.

All inquiries respecting Advertisements and Subscriptions should be sent to Mr. GEORGE BUTCHER, 4, Crane Court, Fleet Street, E.C.

